# MONTANA KINDERGARTEN MATHEMATICS STANDARDS EXPANDED GUIDANCE

MONTANA OFFICE OF PUBLIC INSTRUCTION (OPI)

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# INTRODUCTION TO THE MONTANA KINDERGARTEN MATHEMATICAL PRACTICE AND CONTENT STANDARDS

This document provides specific guidance for understanding and implementing the Montana Standards for Mathematical Practices and Mathematics Content at the **kindergarten level**. Adopted in 2025 and implemented in 2026, these standards are designed to build a strong foundation in mathematics for young learners, developing their readiness for college, career, and community engagement. The Standards for Mathematics Content do not dictate curriculum, or pedagogy, but rather drive curriculum creation. These kindergarten standards, as part of the K-12 standards, define end-of-year expectations and a cumulative progression designed to enable students to meet college and career readiness expectations no later than the end of high school. (Administrative Rule 10.53.101)

The Montana Mathematics Standards also reflect the constitutional mandate to provide instruction that includes the distinct and unique heritage and contemporary contributions of American Indians in a culturally responsive manner (Montana Constitution Article X Section 1(2) and statutes §20-1-501 and §20-9-309 2(c), MCA). This allows students to recognize and respect the historical and contemporary manifestations of mathematical knowledge across the unique cultures of Montana's 12 federally recognized tribes, ensuring that the teaching of mathematics in Montana integrates cultural understanding, respect, and relevance for all Montana students.

## Purpose of this Document

This document serves as a primary guide for those in Montana working to align mathematics education across kindergarten. This **kindergarten-specific** guidance document aims to:

- Clarify the purpose and goals of the Montana Standards for kindergarten mathematics.
- Provide an overview of the standards for educators, families, students, and others invested in kindergarten mathematics education.
- Highlight the developmental and instructional considerations unique to kindergarten.
- Offer general notes as well as instructional, IEFA integration, and proficiency rubric examples to support the practical application of the standards in a kindergarten context.

*For K-12 or alternate grade level support, please refer to the **K-12 guidance document** or relevant **expanded grade-level specific guidance documents**, which outline special considerations, examples, and elaborations by grade.*

# Frequently Asked Questions - Navigating the Kindergarten Standards

## What are the standards?

**Content standards** define the knowledge or skills that every student should know and be able to do at the conclusion of a particular grade level (REL Southeast, 2020). Montana's mathematics content standards begin with kindergarten and continue through twelfth grade, providing a clear progression of learning that builds a strong foundation in mathematical concepts and procedures.

In addition, Montana includes K–12 mathematical **practice standards**, which guide the development of critical thinking, reasoning, and problem-solving abilities in age-appropriate ways throughout students' educational journeys. Combined, the content and practice standards are designed to equip students with the mathematical skills necessary for success in adulthood, career pathways, and post-secondary education, developing universal abilities that extend far beyond the classroom.

Students grow into informed thinkers who can analyze complex problems, make data-driven decisions, and contribute meaningfully to society through mastering both the knowledge from content standards and the habits of mind fostered by the mathematical practices. These skills prepare students to navigate challenges in their personal lives, pursue diverse opportunities, and participate as active, thoughtful citizens in a rapidly evolving world.

## How should the coding scheme be read and understood?

The Montana mathematics content standards use a structured coding system to help educators, schools, and invested parties efficiently locate individual standards within the general framework. While the coding structure is consistent across K-12, there are slight variations between the K-8 and high school (9-12) standards to reflect the additional organization components relevant to the organization of the high school standards.

*Elements across the Kindergarten Standards*

All kindergarten standards follow a coding scheme that includes the following elements:

1. **State indicator: MT**
   Every Montana mathematics content standard begins with the MT designation, signifying that the standard is unique to the state of Montana and reflects the standards Montana has codified within its Administrative Rules.

2. **Grade Level: K**
   *This element identifies the grade level of the standard:*

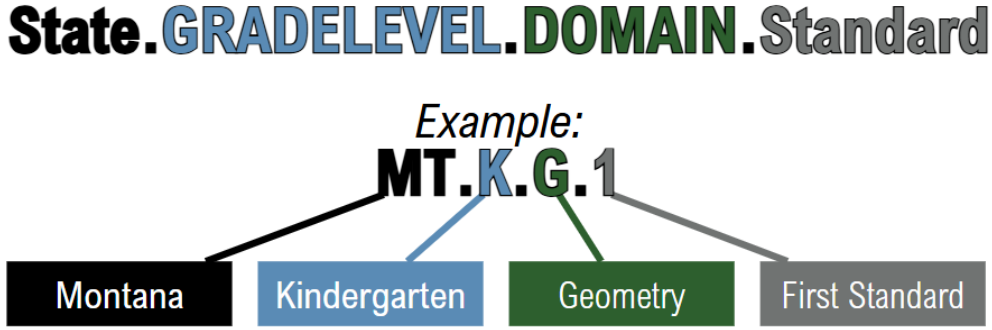
- Kindergarten is indicated by **"K"**

3. **Domain: Abbreviated Representation**
   Each standard is categorized within a domain, represented by a short abbreviation. A **domain** within the kindergarten content standards for mathematics is a **broad organizational category** that groups related standards around a key mathematical concept or set of concepts (REL Southeast, 2020). Domains support the organizational structure and help illustrate the progression of mathematical ideas across grade levels. Examples of domains across the kindergarten standards include but are not limited to, Geometry, Counting and Cardinality, and Operations and Algebraic Thinking.

4. **Standard Item: Number**
   This element specified the standard's sequence within a particular domain.

*Kindergarten Coding Scheme Exemplar*

For K-8 Standards, the structure follows the sequence **MT [Grade Level] [Domain] [Standard Number]**, illustrated in the figure provided:



# Key Considerations for Kindergarten Mathematics Learning

## The Importance of Math in Early Learning

Mathematics in kindergarten lays the foundation for success in later grades. It helps children develop critical thinking, problem-solving skills, and a sense of curiosity about the world around them. Early exposure to math also fosters confidence and a positive attitude toward learning and mathematical thinking.

Research provided by the Regional Education Laboratory (REL) to the writing team during the standards revision process shaped the revisions to the mathematics content standards. This research can be reviewed in full in the REL Handout A. Key areas of emphasis from this research include:

- **Essential Content Areas:** Key foundational skills include counting with 1-to-1 correspondence, subitizing (recognizing small quantities without counting), understanding place value, and early algebraic thinking. These skills are critical for later mathematical success.
- **Instructional Strategies:** Effective practices include the use of learning progressions, play-based activities, and a balance between teacher-directed and student-centered learning. Multiple representations, such as visual aids and manipulatives, help students move from concrete to abstract thinking.

## The Importance of Cultural Relevance

In alignment with Montana's constitutional mandate and evidence-based research, this document encourages incorporating culturally responsive teaching practices. Educators are encouraged to include examples and activities that reflect the heritage and contributions of Montana's Indigenous Peoples, as well as other diverse global and local cultures, to make mathematics meaningful for all students.

Research provided by the Regional Education Laboratory (REL) to the writing team during the standards revision process shaped the revisions to the mathematics content standards. This research can be reviewed in full in the REL Handout A and REL Handout B. Key areas of emphasis from this research include:

- **Cultural Relevance:** REL Handout A recommends incorporating cultural diversity into early math instruction to build students' mathematical identity and appreciation for diversity. However, more research is needed to explore how culturally relevant pedagogy impacts early childhood math education.

- **Practice Considerations:** REL Handout B highlights the process (practice) standards as a methodology to address diverse learners' needs. In particular, culturally relevant pedagogy and social-emotional supports are recommended for teaching mathematics in all communities. The literature indicates that more research is required in this area.

## NCTM Position Statement on Mathematics in Early Childhood Learning:

The National Council of Teachers of Mathematics released the following position statement regarding Mathematics in Early Childhood Learning in November 2022:

> *"Early childhood learning lays the foundation for a child's mathematical journey. Young children flourish when supported in rich learning environments; yet access and outcome vary significantly by social identities. To approach early childhood learning through the lens of equity requires the early childhood education system to acknowledge that the disenfranchisement and discrimination faced by young children, their families, and early childhood educators are systemic. Equitable early childhood education demands culturally and linguistically responsive teaching; developmentally expansive and inclusive practices that respect diversity and value all children's strengths; and the voices of caregivers, families, educators, and children elevated in the decision-making process. Such practices in turn require that early childhood teachers have the support of policies, organizational structures, and resources that enable them to succeed in this challenging and important work."*

To ensure that all children have access to mathematics learning opportunities, they recommend that educators of young students engage in the following practices:

- Capitalize on the wonder and joy children naturally bring to their mathematical learning and their observations of the world.
- Use curriculum and teaching practices that build and strengthen children's problem-solving and reasoning.
- Accept and appreciate that all children have rich and diverse cultural, linguistic, home, community, and lived experiences on which to build mathematics learning.
- Build partnerships and opportunities for collaboration with students, families, community leaders, and policymakers to address barriers to educational attainment.
- Develop systems of reflective practice across affected parties for equitable access to early care and childhood mathematics learning opportunities. (NCTM, 2022).

# MONTANA K-12 MATHEMATICAL PRACTICE STANDARDS

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in all students. These practices are rooted in fundamental **processes and proficiencies** that have long been central to effective mathematics instruction.

As part of the revision process for Montana's mathematics standards and practices, the revision task force reviewed research compiled by the Regional Education Laboratory (REL) Northwest (see Appendix X: References). This analysis found that the eight mathematical practices adopted by Montana in 2011 – originating from the 2006 NAEP Mathematics framework developed by the National Assessment Governing Board (NAGB) and were later incorporated into the Common Core State Standards – no longer fully reflected current research and instructional standards.

The 2026 NAEP Mathematics framework integrates recent research on cognitive development, instructional practices, and evolving mathematical needs in an increasingly data and mathematics-reliant society, offering a clearer vision of the skills students need to understand and apply mathematics in relevant contexts (NAGB, 2021). The task force examined this framework while recognizing the need for a more modern and comprehensive framework that reflects the unique needs of Montana learners.

While the five mathematical practices outlined in the NAEP framework provided valuable skills for Montana students, the task force determined that a full adoption would not adequately address the diverse needs of Montana's learners. Instead, they recommended revising Montana's mathematical practices to reflect both national research-based best practices and state-specific educational priorities. The revision aimed to preserve alignment with the language and intent of the NAEP practices while ensuring that Montana's students develop mathematical habits that are relevant to their unique cultural, educational, and career trajectories.

Therefore, Mathematical Practices numbered 2 through 6 have been adapted from the NAEP Framework. These practices emphasize a deep understanding of mathematical thinking reflecting decades of efforts to define higher-order reasoning, problem-solving, and mathematical communication (NAGB, 2022). Additionally, Mathematical Practices 1 and 7 were developed to reflect specific priorities identified by Montana educators, ensuring that the state's mathematical practices are both research-informed and responsive to the needs of Montana's students and communities.

## What is a Mathematical Practice Standard?

A **mathematical practice standard** is a specific statement that defines the **how** of student engagement in mathematical reasoning, problem-solving, communication, and collaboration (Harbin Miles & Williams, 2016). These standards describe expertise that mathematics educators at all levels should seek to develop in their students to support proficiency in mathematical thinking. Mathematical practice standards focus on the **processes and practices** students use to apply their mathematical knowledge flexibly, accurately, and efficiently across a variety of applications and scenarios (Harbin

Miles & Williams, 2016). Designers of curricula, assessments, and professional development should connect the mathematical practices to mathematics content.

In addition to stating each of Montana's Practice Standards, the following section provides an example proficiency rubric, identifies key skills, special considerations for kindergarten, and elements of rich mathematical practice learning tasks, and offers suggestions for how adults might support students in acquiring these skills.

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## Proficiency in Mathematical Practice Standards

Embedding mathematical practices within instructional activities can enhance and enrich mathematical learning. These skills support mathematical learning and, as a result, it can be challenging to assess students' proficiency in isolation. Educators should take special care when assessing students on these standards. Assessment can occur in a variety of contexts, including student observations during class activities, student self-assessments, projects or performance tasks, and student portfolios. Clear rubrics and proficiency scales can help educators accurately determine students' proficiency in the Mathematical Practice Standards.

### Notes on Proficiency:

- Proficiency means a student can consistently show they understand and can apply a skill or concept in different situations, without needing extra help. It's about meeting the learning goal with confidence and accuracy.
- These targets are often broken into measurable criteria that describe what mastery looks like for a particular skill or concept.
- Proficiency is demonstrated through evidence of learning, such as assessments, projects, or performances that align directly with the standard.
- There are differing views on the quality versus quantity of evidence for mastery. Some resources argue that a single demonstration of mastery suffices, while others argue that mastery should be established through multiple assessments. Districts are encouraged to explore and adopt the methodology across classrooms that aligns with their pedagogical philosophy and instructional practice. Engaging in discussions at the local level about district and educator preferences greatly benefits students, educators, and families.

## Example Proficiency Rubric:

*When determining students' proficiency in a mathematical practice, it may be useful to utilize a proficiency rubric, such as the one provided below:*

| Beginning | Developing | Proficient | Mastery |
|---|---|---|---|
| The student shows minimal understanding or requires significant support. | The student demonstrates partial understanding but has not yet mastered each skill. The student may be able to independently engage in some skills but may require support in others. It may also be the case that the student requires minimal support across multiple skills. | The student is able to engage in each of the skills identified in the mathematical practice with independence and accuracy in developmentally appropriate ways. | The student is able to engage in the skills identified in the mathematical practice in or beyond developmentally appropriate ways. They are able to engage in this mathematical practice in connection with other mathematical practices or content standards. The student exceeds the standard, showing deeper understanding or application. |
| | | | |

*Achieving proficiency indicates that a student is ready to move on to the next level of learning. It is important to note that, as the practice standards span the K-12 experience, the next level of learning may include applying the mathematical practice to new content standards, or in new developmentally appropriate ways such as utilizing age-appropriate methodologies for proving in upper grade levels.*

## Mathematical Practice Standard 1 – Problem-Solve and Persevere:

***Mathematically proficient students:***

- ***Make conjectures, plan, and follow solution strategies***
- ***Evaluate their progress and accuracy***
- ***Engage in sense-making and self-monitoring and***
- ***Persevere in seeking solutions, and value alternative approaches***

## Embedded Skills:

To be considered proficient in this mathematical practice standard, students should be able to demonstrate each of the following skills in developmentally appropriate ways:

- ✓ Make conjectures
- ✓ Make a plan
- ✓ Follow solution strategies
- ✓ Evaluate their progress and accuracy
- ✓ Engage in sense-making
- ✓ Engage in self-monitoring
- ✓ Persevere in seeking solutions
- ✓ Value alternative approaches

## Skills Timeline:

Students may engage in these skills at the following intervals of the solving process:

| Before solving, students will be able to: | During solving, students will be able to: | After solving, students will be able to: |
|---|---|---|
| ✓ Make conjectures | ✓ Follow solution strategies | ✓ Evaluate their progress and accuracy |
| ✓ Make a plan | ✓ Evaluate their progress and accuracy | ✓ Engage in self-monitoring |
| ✓ Engage in sense-making | ✓ Engage in sense-making | ✓ Value alternative approaches |
| | ✓ Engage in self-monitoring | |
| | ✓ Persevere in seeking solutions | |
| | | |

## Kindergarten Applications:

Kindergarten students begin developing problem-solving skills by engaging in exploratory activities and tasks. These activities may include solving simple puzzles, using manipulatives, identifying patterns, comparing objects, or building structures that meet given criteria. They are encouraged to persist through challenges with teacher support and explore alternative approaches when their initial solutions do not work. In kindergarten, students are beginning to approach problems with a trial-and-error mindset and rely heavily on concrete tools and teacher guidance. They are developing the ability to stay engaged in problem-solving tasks and often require encouragement to persist when facing challenges.

## Key Elements of a Rich Problem-Solve and Persevere Task:

Learning tasks that engage students in problem-solving and persevering may have some or all the following characteristics:

- **Open-Ended:** Tasks encourage students to engage in deep thinking, reasoning, and discussion rather than reliance on a single procedure to reach a predefined answer. Teachers might provide activities like solving puzzles, patterns, number or data talks, or building structures that allow students to explore using different strategies. **Kindergarten** students are provided opportunities to play and explore, promoting natural curiosity in mathematics using tools and employing a trial-and-error process in some cases.

- **Conjecture:** Tasks require students to form conjectures about mathematical observations and ideas. Teachers might prompt students to predict outcomes before starting, such as asking, "What do you think will happen if we do this?" or “What do you observe might be happening?” **Kindergarten** students guess or predict outcomes based on observations. For example, they might guess which object is heavier

in a comparison task.

- **Plan-Making:** Learning activities require students to consider how they will approach a problem without providing explicit direction. Teachers may ask questions such as, “How can we begin?”, “What strategies do you think will work?”, and “Can we use strategies from similar problems we have completed before?” **Kindergarten** students will be expected to make a plan and follow through with it. For example, they may decide to count blocks to match a target number or arrange objects by size to solve a problem.

- **Critical Reflection:** Tasks facilitate students’ careful thinking about whether the information they have, their chosen approach, the steps they take, or their final answer are logical. Students are encouraged to keep reflecting during the problem-solving process, which supports understanding and self-checking. **Kindergarten** students can demonstrate understanding by using developmentally appropriate vocabulary to describe why they chose a certain strategy, engaged in certain steps, or knew their answer made sense. For example, students may explain why they grouped items a certain way by saying, “I noticed they were different sizes, I put the big ones together and the little ones together.”

- **Perseverance Through Challenges:** Learning activities include obstacles or setbacks, encouraging students to try different methods. Teachers may support this by asking questions such as "When you’re ready to try again, what might you do differently?" When faced with adversity or mistakes, **kindergarten** students attempt new approaches such as representing subtraction using a drawing to better understand the number remaining in a simple subtraction problem.

- **Multiple Solution Paths:** Learning activities have more than one correct approach, enabling students to find different starting points. This encourages creativity and exploration, while also showing that math is a process that can develop over time, and there are often many correct ways to approach a problem. Teachers might encourage this by challenging students to think about alternative approaches or asking students to share diverse ways of solving aloud. **Kindergarten** students may be provided with opportunities to solve a problem or draw a conclusion in ways that may vary from their classmates, while still attaining the correct answer. For instance, when asked to sort objects by their characteristics, one student may arrange items by size, while another may choose to arrange them by color, or some other characteristic. Students in **kindergarten** may also have opportunities to use a variety of strategies rather than being restricted to a single method. For example, when learning addition and subtraction, they should practice with flexible strategies beyond the traditional algorithm. During problem-solving tasks, students should be encouraged to apply different approaches or be exposed to discussions that highlight the various methods classmates used.

- **Opportunities for Reflection:** Tasks include moments for students to assess their progress. Educators may ask questions such as, "How did you solve this?", "What could you try next?", or “Does your answer make sense?” and offer opportunities for students to consider their progress and whether their solutions made sense and were appropriate for the circumstances. In **kindergarten**, students can engage in

reflection by determining whether their answers align with the problem's context, assessing the effectiveness of their chosen strategy, and exploring tools or manipulatives that could support their thinking. For example, when counting objects arranged in different ways, a student might initially provide different answers for the same quantity after the objects are rearranged. The teacher might guide reflection by asking, "Before, you counted nine. What has changed this time? Does your answer still make sense? Why or why not?"

## Ways Adults Can Support Students in Learning to Problem Solve and Persevere:

Some ways adults can support students in developing their problem-solving and persevering skills include:

- **Model Problem-Solving and Perseverance Behaviors:** Demonstrate how to think aloud while solving a problem, such as saying, "I'm not sure this will work, so I'll try another way." Demonstrate perseverance by speaking about things that are challenging for you, for instance, "I'm not quite sure how to do this yet, and I am getting frustrated. I'll take a break and try again when I am ready."

- **Encourage Perseverance:** At this stage, it is important for the adult to support and encourage the child, congratulating them on their hard work, persistence, and creativity in problem solving, rather than reserving praise for when the student discovers the correct answer.

- **Ask Open-Ended Questions:** Use prompts like "What do you think will happen if you try this?" or "Can you show me another way to solve the problem?" in a variety of contexts, including mathematical ones.

- **Provide Tools and Resources:** Offer manipulatives (e.g., number counters, blocks, ten frames, grid paper, etc.), drawings, or other concrete materials to help students explore solutions.

- **Create a Safe Environment:** Foster an atmosphere where mistakes are seen as opportunities to learn, reassuring students that it's okay to try again.

## Mathematical Practice Standard 2 – Abstract and Generalize:

***Mathematically proficient students are able to decontextualize and symbolically represent both mathematical and non-mathematical situations to search for and analyze regularities, patterns, and structures.***

## Embedded Skills:

To be considered proficient in this mathematical practice standard, students should be able to demonstrate each of the following skills in developmentally appropriate ways:

- ✓ Decontextualize mathematical and non-mathematical situations
- ✓ Symbolically represent mathematical and non-mathematical situations
- ✓ Search for regularities, patterns, and structures
- ✓ Analyze regularities, patterns, and structures

## Skills Timeline:

Students may engage in these skills at the following intervals of the solving process:

| Before solving, students will be able to: | During solving, students will be able to: | After solving, students will be able to: |
|---|---|---|
| ✓ Decontextualize mathematical and non-mathematical situations. | ✓ Symbolically represent mathematical and non-mathematical situations. | ✓ Symbolically represent mathematical and non-mathematical situations. |
| ✓ Search for regularities, patterns, and structures. | ✓ Search for regularities, patterns, and structures. | ✓ Analyze regularities, patterns, and structures. |
| | ✓ Analyze regularities, patterns, and structures. | |
| | | |

## Kindergarten Applications:

Kindergarten students begin to abstract and generalize by identifying and describing patterns, relationships, and structures in familiar contexts. These activities help them connect concrete experiences to symbolic representations in developmentally appropriate ways. At this stage, students are focused on observing and describing specific examples of patterns or relationships, often relying on concrete manipulatives or visual aids. They are not yet generalizing broadly or applying abstract reasoning independently.

## Key Elements of a Rich Abstract and Generalize Task:

Learning tasks that engage students in abstracting and generalizing may have some or all the following characteristics:

- **Decontextualization:** In mathematics, tasks that involve decontextualization require separating a concrete problem from its application context to represent it abstractly (common examples of this can be found in word or story problems). Students should be required to represent contextual information in mathematical ways. Teachers may support this by providing materials, representations, or strategies that help students translate the information they are presented with. For **kindergarteners,** this might involve using drawings, tallies, numerals, or counters to represent a situation, like three books becoming a group of five after two are added.

- **Symbolic Representation:** Learning activities involve symbols, numerals, and visual representations of mathematical concepts to support forming connections between abstract and concrete thinking. In **kindergarten**, students use visual representations, such as drawing lines, shapes, or numerals to express quantities or relationships. For example, drawing three lines to represent "three braids of sweet grass," or writing the numeral "5" to represent "five apples."

- **Pattern Recognition and Exploration:** Tasks provide opportunities for students to notice, create, or extend patterns using tools, strategies, or representations to help students identify regularities. **Kindergarten** students work with simple patterns that may appear in objects (e.g., red-blue-red-blue), movements (e.g., clap-stomp-clap), or numbers (e.g., counting by tens). They may engage with tasks that involve creating or extending patterns using blocks, beads, drawings, numerals, or any number of symbolic or physical mathematical concepts.

- **Structural Analysis:** Activities ask students to recognize, understand, and utilize patterns, relationships, or properties within mathematical concepts to generalize and apply mathematical ideas. In **Kindergarten**, students may be asked to work with patterns and structures in shapes, objects, characteristics (such as sorting blocks by color or size), compose and decompose numbers (such as 10 can be made from 3 + 7, 6 + 4, etc.), the counting sequence (such as the pattern by tens in the number system), etc.

- **Generalization:** Tasks require identification of patterns, prediction of outcomes, or application of mathematical principles to broad contexts and applied situations. Students will need to abstract key ideas and extend them to new situations, both real and theoretical. In **kindergarten**,

students may be asked to describe what they notice, predict what comes next, or apply this thinking in new contexts, helping them move toward abstract thinking. For example, generalizing simple addition and subtraction rules (e.g., “when I add 1, the number always gets bigger by 1”), or, noticing that shapes have consistent properties (e.g., “triangles always have three sides”).

- **Relevant Contexts:** Use examples relevant to students’ lived experiences, local communities or Indigenous Peoples of Montana where students must consider how mathematical theories apply to situational contexts. **Kindergarten** students may work within simple and developmentally appropriate contexts such as arranging toys, counting natural objects, or identifying shapes in familiar structures in their communities, to bring meaning to abstract ideas.

## Ways Adults Can Support Students in Learning to Abstract and Generalize:

Some ways adults can support students in developing their abstracting and generalizing skills include:

- **Model Observing Patterns and Relationships:** Verbally describe patterns or groupings as they arise, such as saying, "I see a red-blue-red-blue pattern here. What do you think comes next?"

- **Ask Guiding Questions:** Use prompts like, "Can you show me a pattern with these blocks?" or "What do you notice about these shapes?"

- **Provide Tools and Examples:** Offer manipulatives such as counters, blocks, or pictures to help students experiment with representing quantities or structures.

- **Encourage Explanation:** Prompt students to explain their reasoning, such as asking, "Why did you group these objects?" or "How did you decide what comes next in the pattern?"

- **Reinforce Vocabulary:** Use grade-appropriate, content area vocabulary terms frequently to help students articulate their observations and ideas. (e.g., “repeat,” “group,” “pattern,” and “same,” “bigger,” “triangle,” etc.). ***Refrain from making up terms for formal mathematical vocabulary terms in an effort to simplify the language*** – this creates challenges for students in the future (e.g. using “plus-ing” instead of “addition”) and creates confusion for students in later grades, requiring students to relearn vocabulary in tandem with more challenging mathematical concepts.

## Mathematical Practice Standard 3 – Justify and Prove:

***Mathematically proficient students create, evaluate, justify, and refute mathematical claims in developmentally and mathematically appropriate ways.***

## Embedded Skills:

To be considered proficient in this mathematical practice standard, students should be able to demonstrate each of the following skills in developmentally appropriate ways:

- ✓ Create mathematical claims in developmentally and mathematically appropriate ways
- ✓ Evaluate mathematical claims in developmentally and mathematically appropriate ways
- ✓ Justify mathematical claims in developmentally and mathematically appropriate ways
- ✓ Refute mathematical claims in developmentally and mathematically appropriate ways

## Skills Timeline:

Students may engage in these skills at the following intervals of the solving process:

| Before solving, students will be able to: | During solving, students will be able to: | After solving, students will be able to: |
|---|---|---|
| ✓ Create mathematical claims in developmentally and mathematically appropriate ways | ✓ Create mathematical claims in developmentally and mathematically appropriate ways | ✓ Create mathematical claims in developmentally and mathematically appropriate ways |
| ✓ Evaluate mathematical claims in developmentally and mathematically appropriate ways | ✓ Evaluate mathematical claims in developmentally and mathematically appropriate ways | ✓ Evaluate mathematical claims in developmentally and mathematically appropriate ways |
| ✓ Justify mathematical claims in developmentally and mathematically appropriate ways | ✓ Justify mathematical claims in developmentally and mathematically appropriate ways | ✓ Justify mathematical claims in developmentally and mathematically appropriate ways |
| ✓ Refute mathematical claims in developmentally and mathematically appropriate ways | ✓ Refute mathematical claims in developmentally and mathematically appropriate ways | ✓ Refute mathematical claims in developmentally and mathematically appropriate ways |

| | | |
|---|---|---|

** **Special Note:** Students may engage in each of the four skills embedded within this standard at any stage of the solving continuum – depending on the task – but the purpose and depth evolve as students' progress through the process.

## Kindergarten Applications:

Kindergarten students begin to justify and prove their ideas by explaining their reasoning and engaging in simple evaluations of mathematical claims using concrete examples and age-appropriate vocabulary. In kindergarten, students begin to engage with reasoning but may not yet possess the ability to generalize or justify their thinking at elaborate levels. They are starting to explore patterns and repeated reasoning through specific examples, but not yet connecting them to overarching concepts, and they are relying on teacher guidance to learn how to provide explanations or correct reasoning. These activities help them build confidence in their thinking and develop skills foundational to reasoning, in ways that are developmentally appropriate.

## Key Elements of a Rich Justify and Prove Task:

Learning tasks that engage students in justifying and proving may have some or all the following characteristics:

- **Make and Test Claims:** Tasks prompt students to form statements they believe might be true based on their observations and then test these claims using mathematical methods. In **kindergarten**, students might describe mathematical observations and test these claims in developmentally appropriate ways. For instance, making statements such as "I think these two groups have the same number of blocks" or stating, "I think this ribbon is longer than this one," then testing their hypothesis.

- **Evaluation of Claims:** Learning activities encourage students to determine whether a claim is accurate by comparing or testing it in mathematically appropriate ways. **Kindergarten** students may use simple means to evaluate a claim, such as by counting objects or drawing pictures. These can also help develop justification skills. For instance, if a student is provided a statement such as "These two groups have the same number of blocks," they can then count the blocks to confirm or deny that the statement is true.

- **Evidence-Based Reasoning to Justify:** A learning task might require students to explain and provide evidence of their thinking using developmentally appropriate tools (e.g., technology, manipulatives, etc.), vocabulary, and methods (e.g., verbal statements, drawings, etc.). **Kindergarten** students will use simple language, gestures, or tools such as drawings or ten frames. For instance, they might say, "I counted five blocks here and five blocks here, so they are the same."

- **Opportunities for Refutation:** Tasks provide flawed examples or incorrect claims for students to analyze, correct, and justify with evidence, fostering critical thinking. Tasks may also encourage students to identify and revise their own misconceptions. For example, **kindergarten**

students can recognize and explain mistakes, such as correcting a peer who claims four blocks are more than six by providing reasoning. They may also reflect on their own learning, saying, "I thought big coins were worth more, but then I saw the numbers. The dime is smaller, but it's worth more than the nickel!" At this age, students benefit from learning to disagree respectfully.

- **Concrete Examples:** Tasks involve using manipulatives, drawings, or real-world objects to support students in developing their reasoning. For instance, in **kindergarten**, students may be asked to decide which group of objects has more. In this scenario, they will pick a group, then likely count the number of objects in each group and evaluate their claim. The concrete example helps students draw these connections and provide reasoning at the early developmental stages.

## Ways Adults Can Support Students in Learning to Justify and Prove:

Some ways adults can support students in developing their justifying and proving skills include:

- **Model Clear Explanations:** Demonstrate how to explain reasoning, such as saying, “I know these groups are equal because I counted five in both.”
- **Ask Probing Questions:** Use prompts like, “How do you know that’s true?” or “Can you show me why this works?”
- **Provide Opportunities for Practice:** Require students to explain their reasoning frequently, both individually and in groups.
- **Encourage Reflection:** After students provide explanations, ask follow-up questions like, “What made you think that?” or “Does this always work?”
- **Help Students Learn to Disagree Respectfully:** Consider introducing common misconceptions and guide students in refuting them while modeling appropriate communication.
- **Praise the Process:** Creating, evaluating, justifying, and refuting mathematical claims are fundamental to mathematics at all levels. Praising students for this process—even when they’re wrong—builds confidence. Remind students that mathematicians spend years solving just one problem!
- **Foster a Safe Environment:** Ensure students feel comfortable sharing their reasoning, even if it’s incorrect, by reinforcing that mistakes are valuable learning opportunities.

## Mathematical Practice Standard 4 – Model with Mathematics:

***Mathematically proficient students:***

- ***Make sense of a scenario***
- ***Identify a problem to be solved, and mathematize it, and***
- ***Apply a mathematical model to reach a solution and verify its viability.***

## Embedded Skills:

To be considered proficient in this mathematical practice standard, students should be able to demonstrate each of the following skills in developmentally appropriate ways:

- ✓ Make sense of a scenario
- ✓ Identify a problem to be solved
- ✓ Mathematize problems
- ✓ Apply mathematical models to reach a solution
- ✓ Verify the validity of a chosen mathematical model

## Skills Timeline:

Students may engage in these skills at the following intervals of the solving process:

| Before solving, students will be able to: | During solving, students will be able to: | After solving, students will be able to: |
|---|---|---|
| ✓ Make sense of a scenario | ✓ Mathematize problems | ✓ Verify the validity of a chosen mathematical model |
| ✓ Identify a problem to be solved | ✓ Apply mathematical models to reach a solution | |
| | | |

## Kindergarten Applications:

Kindergarten students begin to model with mathematics by using objects, drawings, and gestures to represent real-world problems. These activities help students connect their everyday experiences to mathematical ideas in developmentally appropriate ways. At this stage, students rely heavily on physical tools and teacher guidance to explore mathematical concepts. They are learning how to translate situations into simple representations and how to test their models to see if they make sense.

## Key Elements of a Rich Model with Mathematics Task:

Learning tasks that engage students in modeling may have some or all the following characteristics:

- **Mathematize:** Tasks require students to translate contextual information into mathematical problems. For example, if given a scenario where the Tribal or City Council is missing chairs for some of its members, **kindergarten** students might use blocks to show how many more chairs are needed at the table before the council meeting can begin.

- **Real-World Scenarios:** Learning activities present situations and contexts familiar to students, such as socializing with friends or solving community problems, to help them create and test mathematical models. In **kindergarten**, students use familiar contexts such as sharing snacks or organizing toys.

- **Sense-Making:** Tasks require students to make sense of realistic scenarios or situations using mathematics. Often, activities are accompanied by tools or resources, such as manipulatives, drawings, explanations, or other resources to help students make sense of scenarios visually, physically, verbally, symbolically, and contextually. In **kindergarten**, students might be presented with a scenario such as “our class wants to give one flower to each teacher in the school for Teacher Appreciation Week. We have 12 flowers. How can we find out if we have enough?” students might ask questions like “how many teachers are there?” to make sense of the scenario.

- **Problem-Solving and Verification:** Tasks include aspects that ask students to create a model, test it, and check if their model and solution accurately reflect the problem. For example, **kindergartners** might recount their blocks or redraw their pictures to make sure the solution works.

- **Student Agency:** Activities create opportunities for students to be empowered in the problem-solving process such as considering a scenario, defining a problem presented in the scenario, and selecting the approach to mathematize and solve. **Kindergarten** students may choose a community-based problem, like broken playground equipment, and develop a fundraising plan to replace it with their teacher. They may engage in mathematics by counting how many donations they will need to collect, or by helping to measure the space where new equipment

will go (for example).

- **Multiple Entry Points or Multiple Problems to be Solved:** Learning activities contain multiple mathematical problems students can choose to identify or multiple entry points for solution-making in a single problem. In **kindergarten**, this may look like offering a play-based or story-driven activity that allows for varying levels of engagement and solving approaches, for instance, "How many swings do we need if each friend wants one?" or "The caterpillar ate 2 apples then 3 pears, how many servings of fruit did he eat?"

- **Productive Struggle:** Tasks should provide scaffolded challenges, resources, and encouragement to support students in modeling situations mathematically. Students should be challenged in ways that feel uncomfortable but not impossible and able to persevere without feeling overwhelmed. **Kindergarteners** may be provided with tools such as ten frames or number lines to encourage them to try challenging problems, rather than quit or wait for a hint or support from the teacher.

- **Engagement, Curiosity, and Creativity**: Learning activities contain accessible opportunities for students of varying abilities and proficiency to engage in the task with natural curiosity and promote the utilization of creative thinking, mathematical representation, and problem-solving. **Kindergarten** students may be exposed to play-, art-, exploration-, or story-based activities that promote their natural curiosity and creative spirit, fostering a solid foundation of appreciation for and comfort with mathematical principles (NCTM, 2005; Parlakian (NAEYC), 2022).

## Ways Adults Can Support Students in Learning to Model with Mathematics:

Some ways adults can support students in developing their modeling skills include:

- **Promote Mathematical Inquiry:** Ask questions such as "What mathematical questions do we have about this situation?", "What are you curious to know more about?", or "How can math help us in this scenario?"

- **Pose Open-Ended Questions:** Use prompts like, "What would help us model this situation?" or "What would help us better understand the problem?"

- **Model the Use of Tools and Resources:** Demonstrate how to use a variety of tools and resources to represent and solve problems. For example, in the classroom, if you are graphing a line, explain why a straight edge is useful. In the context of the home, caregivers might articulate to children how a tape measure and level might help hang a picture on a wall and support calculating the placement of the frame.

- **Encourage Verification:** Ask students, “Does your model match the problem?” or “Can you check to see if your answer makes sense?”

- **Provide Realistic Contexts:** Design tasks that reflect students' daily experiences to enhance relevance and engagement. Where appropriate, integrate community-based or culturally significant scenarios, including those of the Indigenous Peoples of Montana, to help students recognize math as a powerful tool for problem-solving in realistic situations. This approach can empower students to see math as a tool for overcoming obstacles in their daily lives and create a sense of pride, ownership, and accomplishment in learning.

- **Celebrate Creativity:** Praise students for unique or innovative ways of modeling problems, reinforcing that there are many ways to make sense of a scenario.

- **Offer Tools and Resources Before Hints or Solutions:** Before providing students with a pathway to the answer, try offering a tool, such as “Can using our blocks help us?” You can stick around and offer encouragement and support as a fellow problem solver instead of a solution bringer. This fosters perseverance and confidence in students.

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## Mathematical Practice Standard 5 – Represent:

***Mathematically proficient students:***

- ***Recognize, use, create, interpret, and translate representations using appropriate methods and tools and***
- ***Understand multiple ways of representing mathematical ideas and how they are related.***

### Embedded Skills:

To be considered proficient in this mathematical practice standard, students should be able to demonstrate each of the following skills in developmentally appropriate ways:

- ✓ Recognize representations using appropriate methods and tools

- ✓ Use representations using appropriate methods and tools

- ✓ Create representations using appropriate methods and tools
- ✓ Interpret representations using appropriate methods and tools
- ✓ Translate representations using appropriate methods and tools
- ✓ Understand multiple ways of representing mathematical ideas
- ✓ Understand how multiple ways of representing mathematical ideas are related

## Skills Timeline:

Students may engage in these skills at the following intervals of the solving process:

| Before solving, students will be able to: | During solving, students will be able to: | After solving, students will be able to: |
|---|---|---|
| ✓ Recognize representations using appropriate methods and tools | ✓ Use representations using appropriate methods and tools | ✓ Interpret representations using appropriate methods and tools |
| ✓ Understand multiple ways of representing mathematical ideas | ✓ Create representations using appropriate methods and tools | ✓ Understand multiple ways of representing mathematical ideas |
| | ✓ Interpret representations using appropriate methods and tools | ✓ Understand how multiple ways of representing mathematical ideas are related |
| | ✓ Translate representations using appropriate methods and tools | |
| | ✓ Understand how multiple ways of representing mathematical ideas are related | |
| | | |

## Kindergarten Applications:

Kindergarten students begin to recognize and create representations of mathematical ideas using physical objects, drawings, contextual applications, and simple symbolic or verbal statements. At this stage, they focus on understanding how to use these representations to communicate their thinking and solve problems. They also start to explore how multiple representations (e.g., visual, symbolic, verbal, contextual, and physical) can show the same mathematical idea and how these representations relate to one another. Kindergarten activities should emphasize concrete, pictorial, and symbolic representations, as these form the foundation for higher-level thinking. Physical tools such as counters, cubes, ten frames, base-ten blocks, dominoes, beads on a string, tangrams, fingers, clapping, and playdough help students explore math concepts hands-on. Visual representations, including tally marks, circles, simple graphs, and part-part-whole models, support number sense and problem-solving. Symbolic representations, such as numerals, mathematical symbols (e.g., =, +, -), and simple equations, introduce abstract reasoning. Additionally, students express mathematical ideas verbally through storytelling, word problems, explanations, and acting out scenarios. Using multiple representations provides opportunities for all learners to engage and build a strong mathematical foundation.

## Key Elements of a Rich Represent Task

Learning tasks that engage students in representing may have some or all the following characteristics:

- **Recognition of Representations:** Tasks present mathematical concepts in multiple forms (e.g., visually, symbolically, verbally, contextually, or physically) and prompt students to recognize them as representations of the same mathematical idea. In **kindergarten**, students might be shown three blocks and asked to recognize that this grouping represents the number three.

- **Multiple Representations:** Tasks incorporate recognizing or using visual, symbolic, verbal, contextual, or physical representations to deepen their understanding. For example, **kindergartners** might count objects, draw corresponding pictures, and then write the matching numeral. Using tools such as counters, drawings, and physical gestures, they can model mathematical concepts like drawing circles to represent huckleberries or using rods to show addition. Emphasizing multiple representations at this stage supports the development of concrete, pictorial, and symbolic thinking, which are all foundational to more advanced skills.

- **Creation of Representations:** Learning activities provide opportunities for students to develop their own representations to make sense of mathematical ideas. In this case, students may not be given a directive of which representation to use, offering the agency to select their own. These self-generated representations strengthen students' mathematical reasoning and problem-solving skills. **Kindergarten** students may draw shapes to represent quantities, arrange tangrams to form geometric figures, or use their hands and feet to clap and stomp patterns.

- **Interpretation of Representations:** Tasks are designed in ways that require students to describe and comprehend the mathematical concepts shown in a representation. For instance, a **kindergartener** might be given a drawing of five circles and asked to identify it as a representation of the number five. A teacher might represent a subtraction problem (5 – 2), by drawing five circles, and crossing out two, then ask students what this represents. Students might answer in a variety of ways, such as "5 minus 2," "3," write the expression "5 – 2," hold up three fingers, or use multiple other ways to interpret the representation.

- **Translation Between Representations:** Tasks prompt students to connect and translate between different forms of representation. **Kindergarten** students may match a drawing to a set of blocks or explain how their picture represents a problem. For example, in response to a verbal statement, "There are five huckleberries in a basket, you eat two, how many remain?" students might translate the situation by writing an expression (5 - 2), drawing five circles and crossing out two, giving a verbal response ("three"), or using other forms of representation.

- **Exploring Multiple Representations:** Learning activities provide opportunities to connect different forms of representation, reinforcing that mathematical ideas can be expressed in many ways. In **kindergarten**, this might mean asking students to try to come up with as many ways as they can to represent the number "five". When asked how they could represent it visually, students might draw personally relevant pictures, such as basketballs, toys, or family members. When asked how they could represent it symbolically, students write an expression where the answer is five (e.g., 4+1), the numeral 5, or five tally marks, etc. This can continue through all types of representation. The teacher should reinforce that all of these representations provide different ways to show the same number.

- **Open-Ended Choices:** Tasks allow students to choose their preferred representation method, promoting creativity and exploration. In **kindergarten**, this might look like providing students with options to demonstrate a number by drawing, building with manipulatives, or writing numerals, giving them the flexibility to express their mathematical thinking in a way that makes sense to them.

## Ways Adults Can Support Students in Learning to Represent:

Some ways adults can support students in developing their representing skills include:

- **Model Different Representations:** Demonstrate using manipulatives, drawings, and symbols to represent the same quantity or problem.

- **Ask Guiding Questions:** Use prompts like, "How can you show this visually?" or "What is an alternate way to represent this?"

- **Provide Opportunities for Translation:** Encourage students to connect representations by asking, “Can you draw a picture for what your blocks show?” or “What does this table tell us about this graph?”

- **Celebrate Diverse Approaches:** Praise students for using different methods to represent a problem, reinforcing that all valid representations help us understand math better.

- **Introduce Real-World Contexts:** Engage students with tasks that involve representing mathematical scenarios from their daily lives to make representations concrete and relevant. For instance, students may be encouraged to find representations of geometric symmetry in their lives, such as through the artistic patterns on Lakota Star Quilts, Mexican Talavera Tiles, structures in their communities, the wings of the Mourning Cloak Butterfly, Wild Rag Scarves, and beyond.

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## Mathematical Practice Standard 6 – Collaborate Mathematically:

***Mathematically proficient students engage in mathematics as a social enterprise through discussion and collaborative inquiry where ideas are offered, debated, connected, and built upon toward solutions, shared understanding, and appreciation of other perspectives.***

### Embedded Skills:

To be considered proficient in this mathematical practice standard, students should be able to demonstrate each of the following skills in developmentally appropriate ways:

- ✓ Engage in mathematics as a social enterprise
- ✓ Engage in mathematical discussions
- ✓ Engage in collaborative mathematical inquiry
- ✓ Offer mathematical ideas

- ✓ Debate mathematical ideas
- ✓ Connect mathematical ideas
- ✓ Build upon mathematical ideas toward solutions
- ✓ Work toward a shared understanding of mathematical ideas
- ✓ Appreciate other mathematical perspectives

## Skills Timeline:

Students may engage in these skills at the following intervals of the solving process:

| Before solving, students will be able to: | During solving, students will be able to: | After solving, students will be able to: |
|---|---|---|
| ✓ Engage in mathematics as a social enterprise | ✓ Engage in collaborative mathematical inquiry | ✓ Work toward a shared understanding of mathematical ideas |
| ✓ Engage in mathematical discussions | ✓ Offer mathematical ideas | ✓ Appreciate other mathematical perspectives |
| ✓ Engage in collaborative mathematical inquiry | ✓ Debate mathematical ideas | ✓ Connect mathematical ideas |
| ✓ Offer mathematical ideas | ✓ Connect mathematical ideas | |
| ✓ Debate mathematical ideas | ✓ Build upon mathematical ideas toward solutions | |
| ✓ Appreciate other mathematical perspectives | ✓ Work toward a shared understanding of mathematical ideas | |
| | ✓ Appreciate other mathematical perspectives | |

## Kindergarten Applications:

Kindergarten students begin to engage in collaborative mathematical activities through group work, discussions and shared problem-solving experiences. At this stage, they are learning to listen to their peers, take turns sharing ideas, and build upon the contributions of others. Collaborative inquiry often involves simple, hands-on tasks where students explore mathematical concepts together, such as counting, sorting, or creating patterns. In kindergarten, students are still learning to frame their ideas verbally and respectfully critique the reasoning of others. Special care should be taken to support the development of this mathematical practice by training young learners in appropriate communication and respectful discourse.

## Key Elements of a Rich Collaborate Mathematically Task:

Learning tasks that engage students in mathematical collaboration may have some or all the following characteristics:

- **Group Problem Solving:** Learning tasks require students to work together to solve a shared problem. This could include all students contributing to a single solution or each student solving a piece of a larger problem, requiring connectivity and collaboration to complete the overall task. In **kindergarten**, students might work together to build a structure that matches a teacher-provided picture.

- **Idea Generation and Sharing:** Activities create opportunities for students to generate, express, and investigate their own mathematical ideas in a group setting. Teachers should encourage students to share freely with the knowledge that their contributions are valued. **Kindergarten** students might be asked to work to arrange varying items into groups by shared characteristics. They would decide together how to organize and count the items (by ones, twos, or fives), and explain their methods to the class.

- **Respectful Discussion and Debate:** Tasks invite students to listen to and respond to their peers' ideas, including offering counterarguments, asking clarifying questions, and making connections between different approaches. Teachers should encourage students to respectfully agree, disagree, and communicate effectively. For instance, when comparing different ways to make ten, **kindergarten** students might provide responses and the teacher may prompt "Do you agree or disagree, why?" Students can respectfully discuss why certain responses are accurate (e.g., 6 + 4) and others are not (e.g., 3 + 8).

- **Building on Others' Ideas:** Tasks support students in co-constructing solutions, encouraging them to build upon their peers' reasoning, rather than working in isolation. In a **kindergarten** classroom, students may engage in a story problem discussion where one student suggests: "If we have three huckleberries and we get two more, we can count "3, 4, 5!" Another student may add, "Yeah! And if we had two more huckleberries, it would be "5, 6, 7!"

- **Appreciation of Other Perspectives:** Activities require students to listen actively and consider their classmates' mathematical ideas, even if they do not fully understand them yet. Learning also fosters curiosity, a willingness to ask questions and explore different ways of thinking. In a shape-sorting activity, **kindergarteners** may group certain shapes together. If some do not understand the reasoning, they may be encouraged to ask, "Can you tell me why you put these in the same group?"

- **Shared Materials & Resources:** Learning activities involve a finite set of tools or materials, requiring students to negotiate, plan, and collaborate to use them effectively. While working with scales to compare the weight of items, **kindergarten** students may only have two scales requiring them to take turns weighing objects and deciding whose turn is next while keeping everyone involved.

- **Reciprocal Responsibility & Participation:** Tasks provide opportunities for each student to play a meaningful role in the group's process and include measures that hold students accountable to their group. Each child should be contributing and engaged in the collective mathematical learning experience. When sorting objects into categories as a group, **kindergarteners** might share the responsibility of deciding on characteristics to sort by and assign each person to look for one characteristic, ensuring that each student has a role, and no one is left out.

- **Relational Learning & Community Building:** Learning activities help students see math as a social activity that strengthens relationships among learners and peers through shared problem-solving experiences. A **kindergarten** class may work together to create a number line using their bodies, standing in order from 1 to 10. They must communicate, adjust positions, and help each other find the correct spot.

## Ways Adults Can Support Students in Learning to Collaborate Mathematically:

Some ways adults can support students in developing their mathematical collaboration skills include:

- **Normalize Mistakes:** Frame mistakes as a valuable part of learning demonstrating that "not knowing is not failure; it is the first step to understanding" (Finkle, 2016). Encourage students to test ideas, refine strategies, and learn from their attempts. Emphasize that mistakes spark discussion and discovery, fostering a safe and collaborative learning environment.

- **Model Respectful Communication:** Demonstrate how to listen attentively and respond thoughtfully to others' ideas, such as saying, "I like how you thought of that! What if we also tried this?" or "I do not understand what you're saying yet. Can you tell me more?"

- **Facilitate Group Discussions:** Use prompts like, "What do you think of [person's] idea?" or "Can you add to what your friend said?"

- **Encourage Turn-Taking:** Help students navigate conversations and shared materials by reinforcing patience and respect. If students interrupt or struggle to take turns, model mediation by saying, “[Person A] wasn’t finished speaking yet. To fully understand their idea, let’s let them finish. If you have thoughts or questions, raise your hand, and you’ll have a turn next.”

- **Guide Reflection on Group Work:** Ask students to reflect on their collaboration with questions like, "How did working together help us solve this problem?" or "What did you learn from your friends today?"

- **Celebrate Group Success:** Reinforce the value of teamwork by praising the group’s collective effort, such as saying, "You all worked so well together to figure that out!” or “I know it was challenging at times to work together, but you kept going and completed the task—great job!”

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## Mathematical Practice Standard 7 – Culturally Connect:

***Mathematically proficient students:***

- ***Recognize cultural connections and contributions to mathematics and***
- ***Appreciate the role of mathematics in various cultural contexts, including those of tribally specific Montana Indigenous Peoples.***

## Embedded Skills:

To be considered proficient in this mathematical practice standard, students should be able to demonstrate each of the following skills in developmentally appropriate ways:

- ✓ Recognize cultural connections to mathematics

- ✓ Recognize cultural contributions to mathematics

- ✓ Appreciate the role of mathematics in various cultural contexts, including those of tribally specific Montana Indigenous Peoples

## Skills Timeline:

Students may engage in these skills at the following intervals of the solving process:

| Before solving, students will be able to: | During solving, students will be able to: | After solving, students will be able to: |
|---|---|---|
| ✓ Recognize cultural connections to mathematics | ✓ Recognize cultural connections to mathematics | ✓ Recognize cultural connections to mathematics |
| ✓ Recognize cultural contributions to mathematics | ✓ Recognize cultural contributions to mathematics | ✓ Recognize cultural contributions to mathematics |
| ✓ Appreciate the role of mathematics in various cultural contexts, including those of tribally specific Montana Indigenous Peoples | ✓ Appreciate the role of mathematics in various cultural contexts, including those of tribally specific Montana Indigenous Peoples | ✓ Appreciate the role of mathematics in various cultural contexts, including those of tribally specific Montana Indigenous Peoples |
| | | |

** **Special Note:** Students may engage in each of the three skills embedded within this standard at any stage of the solving continuum – depending on the task – but the purpose and depth evolve as students' progress through the process.

## Kindergarten Applications:

Kindergarten students begin to recognize cultural connections in mathematics by exploring how math is a universal human experience with deep historical roots across Indigenous and modern cultures worldwide. They engage with mathematical concepts in relevant ways, such as examining culturally and mathematically significant objects, hearing stories that incorporate math, and learning about mathematical contributions from diverse cultures, including Montana's Indigenous Peoples. Activities may also introduce the historical development of mathematics and how it has shaped contemporary cultural contexts. Students are encouraged to connect their own mathematical learning to their lived experiences and cultural expressions. At this stage, they develop an early awareness of diverse cultural applications in math and an appreciation for its significance in daily life, as well as in Indigenous, local and global communities.

## Key Elements of a Rich Culturally Connect Task:

Learning tasks that engage students in cultural connection may have some or all the following characteristics:

- **Contextual & Cultural Connection:** Tasks provide connection between mathematical concepts and cultural practices. These cultural practices can present in a variety of forms, such as Montana Indigenous Peoples, global cultures, local communities, or students' lived experiences. Teachers may provide examples of cultural contexts or ask students to share math-related traditions or activities such as cooking measurements or traditional games. In **kindergarten**, teachers might provide context related to a local cultural event, such as a community

festival, fair, rodeo, or powwow, and ask students to consider mathematical situations at this event. Examples might include counting money or sales at a vendor booth, weighing animals, adding competition scores, etc.

- **Essential Understandings:** Learning activities with connection to Indigenous practices, peoples, and experiences engage the Essential Understandings and Multicultural Approaches to best align with the principles of Indian Education for All. **Kindergarten** students might be exposed to these understandings in various ways, depending on instructional design.

- **Diverse Perspectives:** Activities may showcase and compare how various cultures approach similar mathematical ideas and cultural concepts. Examples might include number representations, using tools for measuring, or using geometric patterns in artistic expression. Students in **kindergarten** might learn how the seasons are currently measured, then asked to consider how historical peoples might have measured the seasons. After a brief brainstorming session, the teacher might then show examples of seasonal rounds from specific Montana Tribes or explore methods from global cultures. Teachers might also provide examples of traditional practices still in use, such as the Salish practice of telling stories after the first snowfall, or the suggestions for agricultural planting in the Farmers' Almanac.

- **Math as a Universal Tool:** Tasks promote mathematics as a universal tool that has meaning and application across cultures and communities, challenging students to connect mathematical concepts to contextual applications. **Kindergarten** students might engage in this practice by considering how mathematical concepts are used as tools in their homes or lives. Some examples might include counting the number of toys they pick up, measuring food for pets or livestock, or checking how many minutes until school starts. Students will explore how math helps them in these moments.

- **Hands-On and Inquiry-Based**: Tasks provide opportunities for students to actively engage in mathematical reasoning through culturally relevant activities, such as mapping land features with Indigenous methods, solving local community-based problems, or investigating the mathematics of historical architecture. Examples in **kindergarten** might include a presentation of a community problem, such as a school beautification project. Students might inquire how they can solve this problem using their content knowledge. They might engage math skills in counting the number of flowers to plant, or volunteers they will need. They might decide the best month or day to plant, using their knowledge of calendars and seasons.

- **Storytelling and Oral Traditions**: Learning may incorporate narratives, legends, or oral histories that include mathematical thinking, such as counting in traditional games, measuring for seasonal changes, or problem-solving in folktales. **Kindergarten** students might be asked mathematical questions during reading time, such as "how do the animals on this page compare?" Students will use comparative language to respond such as (bigger, smaller, etc.).

- **Connection to Everyday Life**: Activities contextualize math in ways that reflect students' own lives and communities, such as using family recipes to explore ratios or examining how local businesses price and trade goods. **Kindergarten** activities might utilize developmentally appropriate examples with familiar objects or routines.

- **Use of Language and Symbols from Different Cultures**: Tasks may include Indigenous languages, historical number systems, or culturally significant symbols, to expand students' understanding of mathematical representation. **Kindergarten** students might explore counting with different languages or examine different numeral systems.

- **Reflection and Discussion**: Learning tasks prompt students to think critically about their personal cultural experiences with math and consider how different communities and nations approach mathematics. Students in **kindergarten** will begin to learn reflection, and discussion, and start to consider the perspectives of others.

## Ways Adults Can Support Students in Learning to Culturally Connect:

Some ways adults can support students in developing their cultural connection skills include:

- **Review the Essential Understandings Regarding Montana Indians:** This document can support adults in understanding the seven guiding principles behind Indian Education for All. These principles provide a foundation for incorporating Indigenous perspectives into mathematical learning.

- **Integrate Authentic Examples:** Incorporate cultural contexts such as geometric designs in Montana Indigenous art, local events, or astronomy in planting cycles to illustrate how math is embedded in local and cultural traditions. Use realistic historical or modern examples related to global, local, or Indigenous contexts and issues to make math relevant and meaningful to students' lived experiences and communities.
- **Highlight Everyday Math in Practices**: Talk about ways math appears in daily life through traditions like quilting, weaving, cooking measurements, agriculture, or budgeting within different cultural and community contexts.

- **Ask Open-Ended, Reflective Questions**: Encourage thoughtful exploration by prompting students to analyze and connect mathematics to lived or cultural experiences. Questions such as *"What patterns do you see in this design?"*, "*How does your family use numbers at home?", or "How can counting help us figure out how many chairs we need for our guests?"* invite students to share personal experiences and recognize math in everyday contexts.

- **Provide Culturally Relevant, Reliable Resources:** Introduce tools, artifacts, context, or resources with modern and historical significance to different cultures, like Indigenous counting systems or items used in traditional games. Be sure that resources are relevant and come from

reliable sources. **Use caution when engaging technological tools, such as Artificial Intelligence (AI)** as a resource for cultural information – this information must be properly vetted. While large language model AI tools are continually evolving, it is important to recognize that, as of the writing of this document, they have been known to misrepresent or misattribute cultural practices and citations.

- **Invite Community and Cultural Experts**: Partner with Tribal Elders, community members, families, or professionals from diverse backgrounds to share firsthand knowledge of how math is used in their traditions and professions.

- **Recognize and Honor Mathematical Contributions from Many Cultures**: Share stories of the mathematical discoveries of Montana's Indigenous Peoples, American, and global cultures. Ensure that students understand that mathematical knowledge has been independently developed in many places throughout history.

- **Encourage Collaboration Across Cultural and Linguistic Backgrounds**: Support students in working with diverse peers, emphasizing that language and cultural differences are assets to mathematical learning.

- **Encourage Multilingual Math Discussions**: Support students in using their home languages when discussing math, reinforcing that mathematical reasoning is universal and not limited to one language.

- **Model Curiosity and Respect:** Demonstrate a genuine interest in diverse mathematical practices by sharing your learning process and engaging students in discussions about their cultural or experiential observations. Adults do not need to be experts in every culture or the history of mathematics. Modeling respectful inquiry and a willingness to learn fosters a reciprocal learning experience that benefits both students and adults.

- **Encourage Student-Led Cultural Math Connections**: Give students opportunities to research and present how math appears in their own culture or heritage, fostering pride and deeper connections.

# KINDERGARTEN MATHEMATICS CONTENT STANDARDS – OVERVIEW

## Overview:

A **content standard** in mathematics is a specific statement that defines the knowledge, skills, and understandings that students are expected to achieve at a particular grade level or within a course of study (REL Southeast, 2020). Content standards articulate the **what** of student learning, providing clear expectations for the mathematical concepts and procedures that should be taught and mastered.

These mathematics content standards presented here reflect the expectations of what kindergarten students are expected to know and be able to do as reflected in the Administrative Rules of Montana 10.53.502. Expanded guidance, clarifying the meaning, instructional examples, and examples of proficiency rubrics are available for each standard in subsequent sections of this document.

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## Counting and Cardinality (CC)

- Flexibly count to 100 by ones and by tens. (MT.K.CC.1)
- Count beginning from a given number within the known sequence. (MT.K.CC.2)
- Write numbers from 0-20 and represent a number of objects with a written numeral 0-20. (MT.K.CC.3)
- Understand the relationship between numbers and quantities and connect counting to cardinality by recognizing that each successive number name refers to a quantity that is one larger within a normal counting sequence. (MT.K.CC.4)
- Count to answer "how many?" in a variety of arrangements and, given a number, produce a set within 20. (MT.K.CC.5)
- Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group. (MT.K.CC.6)
- Compare two numbers between 1 and 10 presented as written numerals. (MT.K.CC.7)

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## Operations and Algebraic Thinking (OA)

- Represent addition and subtraction in multiple ways. (MT.K.OA.1)
- Solve addition and subtraction problems in context within 10. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities. (MT.K.OA.2)
- Decompose numbers less than or equal to 10 into pairs in multiple ways. (MT.K.OA.3)
- For any number from 1 to 9, find the number that makes 10 when added to the given number. (MT.K.OA.4)

- Flexibly and accurately add and subtract within 5. (MT.K.OA.5)
- Recognize the characteristics of the commutative property in addition. (MT.K.OA.6)

## Number and Operations in Base Ten (NBT)

- Compose and decompose numbers from 11-19 into ten ones and further ones in multiple ways and record each composition or decomposition by a drawing or an equation. (MT.K.NBT.1)

## Measurement and Data (MD)

- Describe several attributes of a single object. (MT.K.MD.1)
- Directly compare two objects with a measurable attribute in common using comparative language. (MT.K.MD.2)
- Classify, count, and sort objects into categories. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities. (MT.K.MD.3)
- Describe attributes and identify the names of coins. (MT.K.MD.4)
- Explain time in days, months, years, and seasons. (MT.K.MD.5)

## Geometry (G)

- Describe the relative positions of objects in their environment. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities. (MT.K.G.1)
- Correctly name shapes regardless of their orientations or overall size. (MT.K.G.2)
- Identify shapes are two-dimensional or three-dimensional. (MT.K.G.3)
- Analyze and compare two- and three-dimensional shapes using informal language and other attributes. (MT.K.G.4)
- Model shapes in the environment. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities. (MT.K.G.5)
- Compose simple shapes to form larger shapes. (MT.K.G.6)

# KINDERGARTEN EXAMPLES AND ELABORATIONS BY STANDARD

This section aims to provide expanded clarification around each standard by providing general notes, instructional examples, Indian Education for All integration examples, and proficiency rubrics. Please read the following explanations of the purpose and intent of each section.

## General Notes:

General notes provide clarity around the intent of the task force and the meaning of each standard. These notes may provide an opportunity to make expectations clearer to families and students, support understanding by non-content experts, or convey expanded information relevant to educator needs.

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## Proficiency Rubric Examples:

The Administrative Rules of Montana (item 10.55.603) states "Local school districts shall develop and implement a proficiency-based learning model that includes curriculum aligned to all content standards and appropriate learning progressions." As a supportive resource, this section provides sample proficiency rubrics that illustrate how students understanding of the mathematics content standard can be determined. These examples are **not mandatory** and are intended solely to guide districts in designing their own proficiency-based systems.

When assessing students on content standards, educators should consider multiple forms of evidence, including classroom observations, student self-assessments, projects or performance tasks, formative and summative assessments, and student portfolios. Using clear rubrics and proficiency rubrics or scales can help educators consistently and accurately measure students' progress and proficiency in mathematics.

## Notes on Proficiency:

- Proficiency is defined by clearly articulated learning objectives or standards. It is the ability to consistently demonstrate a sufficient level of knowledge, skill, or understanding to meet all specific standards or expectations.
- These targets are often broken into measurable criteria that describe what mastery looks like for a particular skill or concept.
- Proficiency is demonstrated through evidence of learning, such as assessments, projects, or performances that align directly with the standard.
- There are differing views on the quality versus quantity of evidence for mastery; some resources argue that a single demonstration of mastery suffices, while others argue that mastery should be established through multiple assessments. Districts are encouraged to explore and adopt a consistent methodology across classrooms that aligns with their pedagogical philosophy and instructional practice. Engaging in discussions at the local level about district and educator preferences greatly benefits students, educators, and families.

## General Example of a Proficiency Rubric:

*When determining students' proficiency in a math content standard, it may be useful to utilize a proficiency rubric, such as the one provided below:*

| Beginning | Developing | Proficient | Mastery |
|---|---|---|---|
| The student shows minimal understanding or requires significant support. | The student demonstrates partial understanding but has not yet mastered each skill within the standard. The student may be able to independently engage in some skills but may require support in others. It may also be the case that the student requires minimal support across multiple skills. | The student is able to engage in each of the skills identified in the content standard with independence and accuracy. | The student may be able to engage in the skills identified in the content standard beyond grade level expectations. They may be able to engage in these skills in connection with other mathematical practice or content standards. The student exceeds the standard, showing deeper understanding or application. |
| | | | |

*Standard-specific examples can be found in each of the expanded guidance for each standard found on the following pages.*

*Achieving proficiency indicates that a student is ready to move on to the next level of learning. Although proficiency is the target goal, all students should be provided with opportunities to demonstrate and develop mastery through mathematically rigorous tasks.*

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## Instructional Examples:

The instructional examples provided are designed to help educators, families, and other stakeholders better understand how kindergarten mathematics standards might be taught and applied in the classroom. While teachers are not required to use these examples, they serve as a valuable resource to support a variety of needs, including:

- **For New or Newly Assigned Teachers:** Offers insights into how kindergarten standards can be effectively taught in classroom scenarios.
- **For Experienced Kindergarten Teachers:** Highlights the instructional shifts introduced with the newly adopted standards.
- **For Instructional Coaches:** Refreshes their understanding of grade-level expectations and provides resources to support classroom educators.

- **For Families**: Provides clear examples of what students are expected to know and do in a classroom context.

These examples are **meant to illustrate possibilities, not prescribe methods**. Local school districts maintain full authority over instructional decisions, ensuring that teaching aligns with the unique needs of their students and communities. Schools may adapt or choose entirely different examples that better fit their local context, and educators are encouraged to use their professional judgment.

Ultimately, these examples are a tool to **foster understanding, spark ideas, and support consistent interpretation** of the state standards.

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## IEFA Integration Examples:

The Office of Public Instruction (OPI) recognizes that educators, families, students, and Tribal representatives across Montana have expressed a need for trusted, high-quality instructional resources that integrate Indian Education for All (IEFA). These IEFA-integrated examples **offer educators an entry point and serve as introductory materials that can inspire further exploration and adaptation.** They **are not** intended to be a comprehensive lesson plan or the definitive approach to IEFA integration. Rather, they offer a **foundation** for educators who are beginning to incorporate IEFA principles or seeking fresh ideas for integration.

Educators are encouraged to use their **professional judgment** when utilizing these examples to recognize that authentic and meaningful IEFA integration is best achieved through **continued learning**, collaboration with **Tribal governments**, and consultation with **knowledgeable community members and Elders**. Where appropriate, educators should collaborate with Indigenous Knowledge Keepers or Elders to bring meaningful learning experiences to classrooms, taking care to **reciprocate shared knowledge through culturally appropriate gift-giving**. While Tribal representatives have reviewed these examples for appropriateness and cultural validity, educators should always strive to build connections with local tribal communities, Indigenous Knowledge Keepers, and local context.

OPI acknowledges that while it has sought collaboration with Indigenous individuals, tribal colleges, cultural committees, Montana educators, and the Montana Advisory Council on Indian Education (MACIE), these individuals do not always represent the full spectrum of philosophies, perspectives, and experiences of each member within a cultural group. Therefore, these documents may undergo revisions and updates should concern or opportunities for improvement be brought to the attention of the OPI regarding the representation of Indigenous Peoples or cultures, or the application of context in pedagogical or culturally responsive ways.

Furthermore, educators should consistently **apply the IEFA Framework**, including the **Multicultural Approaches and Essential Understandings**, to ensure that Indigenous perspectives are represented respectfully and accurately. **Local school districts** maintain authority over how IEFA is implemented, ensuring that instruction is responsive to the needs and contexts of their communities.

Each example includes several components:

- **Context and Connection:** Provides a very brief overview of the context. While this section will provide some general information and details, this section is intended as an **overview of information** that should be researched further to guide classroom instruction. By exploring these contexts further, educators are likely to deepen their understanding of the cultural elements discussed while strengthening classroom instruction. This section is not intended to be perceived as a comprehensive explanation of the cultural context and instead serves as an **entry point for further learning** by providing teachers with a **base-level understanding** and insight into an appropriate context to use in connection with the mathematical standard.

- **Task Description:** This section provides a **brief description of a task** that might engage the mathematical standard through the context provided. Teachers may consider modifying or expanding the task into a fully articulated lesson plan that is relevant to the context of their classroom, community, or the Indigenous community represented. These task descriptions are intended to **provide inspiration and opportunities** for increased IEFA integration in classrooms. Many teachers may notice opportunities to make additional connections across math concepts, content areas, or communities – OPI **enthusiastically encourages** teachers to apply their expertise and lived experiences to strengthen these tasks.

- **Essential Understandings:** According to the Implementation Framework for Indian Education for All:

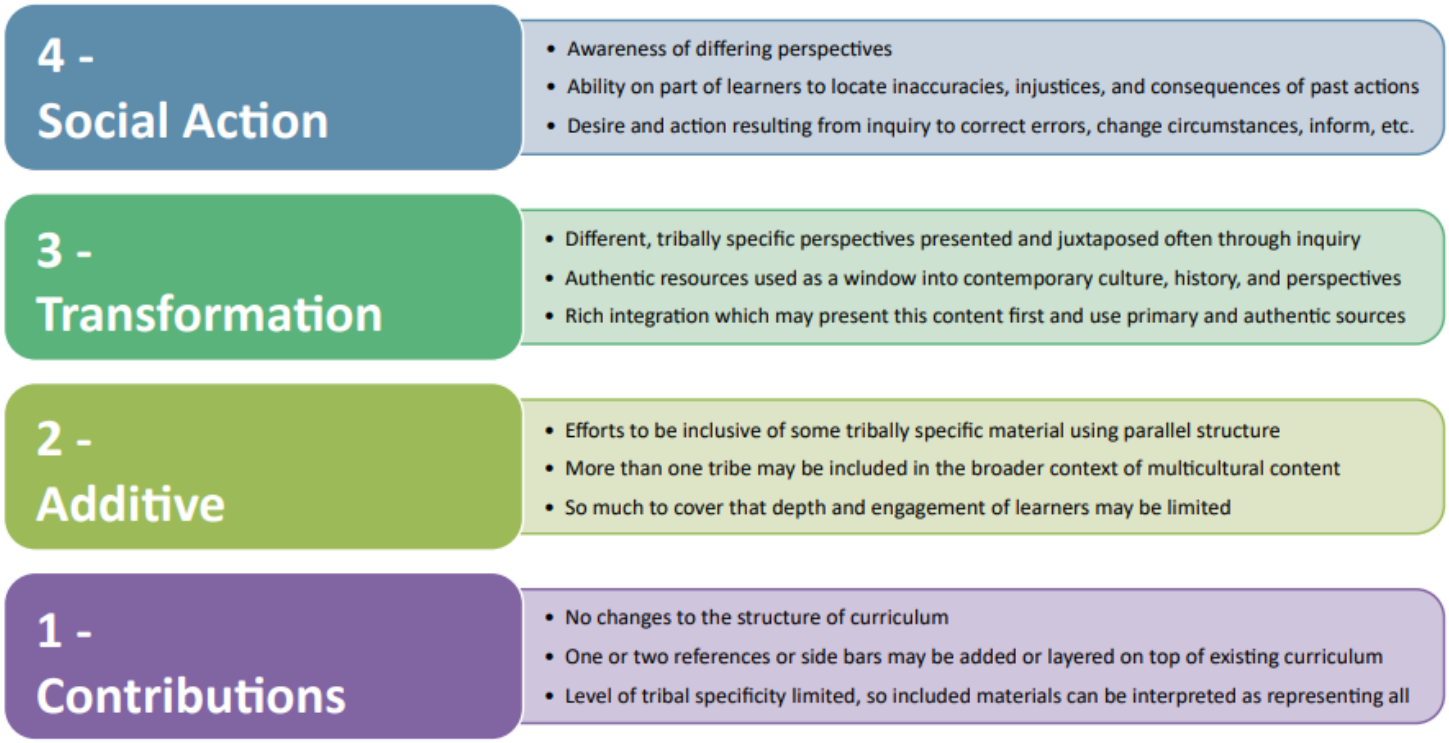
  > "The Essential Understandings were developed by a group of Indian educators representing each Montana tribe, who gathered to attempt to build consensus on a set of common core understandings. These Essential Understandings represent broad concepts common to Montana tribes all students should know. They are gateway standards, or entry points, into the rich histories, cultures, and perspectives of each Montana tribe. The Essential Understandings are big ideas linked to rich content connected to each tribe individually. Sometimes, pressure to cover so much content can result in adding or layering material in the curriculum at a relatively superficial level in order to "check it off the list." This outcome can mean that a curriculum already deemed "a mile wide and an inch deep" just became wider and shallower. Developing a plan and a series of structures to support deeper levels of curriculum development helps to avoid the random addition of American Indian content to the curriculum." (OPI, 2025).

  There are seven Essential Understandings Regarding Montana Indians. Each IEFA example provided indicates which of the seven essential understandings are engaged in the task as it is written, however, local level engagement may vary depending on decisions made by educators in presentation and delivery.

- **Multicultural Approach:** The Implementation Framework for Indian Education for All states:

  > "Dr. James Banks identified four approaches to multicultural education implementation. Awareness of these approaches, or levels, can help teachers and curriculum developers gain greater depth in the curriculum" (OPI, 2025).

There are **four multicultural approaches** that act as levels of depth for multicultural education. The graphic provided here, taken from the Implementation Framework for Indian Education for All, shows a rating scale for these levels.




The multicultural approach(es) identified in this section of the integration guidance merely present **the approach engaged based on the task description**. The teacher's individual application of the task may deviate from the task description, as personal preference, knowledge, and additional connections are engaged. This may therefore result in local practices that exceed or fall below the level indicated in this text. Teachers are encouraged to re-examine practical applications to establish the multicultural approach engaged during local instruction.

- **Relevant Resources:** Relevant resources have been provided for each integrated task. These resources have varied purposes including:
  - **Educator Resources:** Resources may be provided to expand educator awareness of a particular context.
  - **Student Learning Resources:** Student-friendly resources may be provided with the purpose of enriching or expanding student learning and teaching practices.

The types of resources provided range from model lesson plans and research to videos and stories. Each resource has been vetted for accuracy and relevancy. Where appropriate, OPI has provided resources that elevate Indigenous voices, such as recordings of Elders,

traditional stories, Tribe-produced materials, etc. In cases where Indigenous-produced online resources could not be located or authenticated, resources from other academically reliable organizations such as museums, research journals, and government entities have been engaged. Educators are always encouraged to vet these resources themselves for local relevancy and appropriateness, and to partner with Indigenous Knowledge Keepers, Elders, and Tribal representatives to continue to bring high-quality, culturally-appropriate, and authentic materials and instruction to their classrooms.

OPI hopes that, by providing these IEFA recommendations for every standard, classroom teachers will feel supported, prepared, and encouraged to expand classroom integration of Indigenous cultural contexts and mathematical learning. Any teacher seeking further support is enthusiastically encouraged to reach out to the Indian Education Department at the Office of Public Instruction for guidance and resources.

OPI would like to express sincerest gratitude to each individual, Knowledge Keeper, Elder, committee, Tribal College, and Tribal Government that contributed valuable time and resources to vetting this document and aiding it in bringing these resources to educators in Montana. It would also like to thank every educator, family member, and student who has advocated for better applications of IEFA within mathematics through the generations.

# MT.K.CC.1:

**Flexibly count to 100 by ones and by tens.**

## General Notes:

This means that a student must demonstrate an understanding of the structure and patterns in numbers that move between counting by ones and tens based on context or need. Flexibility means recognizing when it's efficient to count by tens versus when counting by ones is necessary.

## Instructional Examples:

- Students may begin counting by ones and then recognize an opportunity to "jump" by tens. For example, when counting a large group of objects grouped into sets of ten, they might count “10, 20, 30” for the groups and then “31, 32, 33” for individual items left over.
- A teacher may take their students for a nature walk in early fall, asking them to count how many leaves they see on the ground, students may employ a variety of strategies for counting the leaves that could demonstrate flexibility such as counting by ones, grouping into piles of ten and counting by tens, or even skills, such as “counting on” (which engages MT.K.CC.2).
- Students might be provided with 100 beads, where every ten beads alternate in color (e.g., 10 red, 10 green, 10 blue, 10 yellow, etc.). The teacher may begin by having students count the beads by tens (e.g., “10, 20, 30…100”), then have them count by ones for each color group (e.g., “1, 2, 3…10” (red), then “11, 12, 23…20” (green) and on. The teacher may also ask students to count to a certain amount (e.g., 70) by tens and then count the remainder by ones (e.g., “71, 72, 73…100). This could prompt discussions about different ways of counting, the fact that the number of objects never changes, or that students may feel certain methods are more efficient.

## IEFA Integration Example: Bundles of Sweetgrass

### Context and Connection:

Sweetgrass is a culturally significant plant for many Montana Indigenous Tribes that is used in ceremonies, as traditional medicine, and beyond. It is important to note that each tribe has unique traditions and symbolism attached to sweetgrass. For example, the Rocky Boy Tribal Seal features a braid of sweetgrass as an element representing communication to the Creator and the Spirits, while the Tsêhésenêstsestôtse/So'taa'eo'o (Northern Cheyenne), Niitsitapi/Pikuni (Blackfeet), Lakota (Sioux), and Annishinabe (Chippewa/Ojibwe) sometimes use sweetgrass in ceremonies. When referencing Sweetgrass with students, be sure to discuss the tribally specific importance of the plant, such as the representation of the three braid strands. To learn more about the specific symbolism, stories, perspectives, or traditions related to sweetgrass from a specific tribe, consider reaching out to local knowledge keepers, Elders, Tribal departments of education, or cultural centers.

## Task Description:

Share the local or tribally specific relevance of sweetgrass with students to prime learning and build connections between the task and the context.

Provide students with visual representations or physical bundles of sweetgrass (or similar objects). Arrange the sweetgrass in groups of ten (symbolizing the braiding process) and individual strands. Ask students to count:

- By ones to determine the total number of strands.
- By tens for the completed bundles, then add any remaining strands.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources: EU 1 and EU 3

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources: Contributions or Additive – Without context specific to a specific Tribe or Tribes, this task would achieve the "contributions" level. With context relating to tribally specific practices, beliefs, traditions, or stories, a slightly deeper depth and engagement might be engaged that would achieve the "additive" level.

## Relevant Resources:

- What Does Sweetgrass Look Like? Cambium Indigenous Professional Services
- Plant Guide: Sweetgrass – United States Department of Agriculture
- Small Number Counts to 100 – Simon Fraser University

## Proficiency Rubric Example:

1. **Beginning:** The student is **not yet able to** count flexibly to 100 by ones and by tens without intensive support.
2. **Developing:** The student **can** flexibly count to 100 by ones or by tens **with some support**.
3. **Proficient:** The student **can** count flexibly to 100 by ones and by tens **with independence and accuracy**.
4. **Mastery:** The student **can** count flexibly to 100 by ones and by tens **with accuracy and independence**. They demonstrate an **advanced understanding** by being able to employ this skill with other standards or by working beyond 100.

# MT.K.CC.2:

**Count beginning from a given number within the known sequence.**

## General Notes:

This standard emphasizes the ability to "count on" from a given number, rather than always starting at one. It requires students to understand the sequential nature of numbers. This is an early foundational skill for addition, subtraction, and number sense.

## Instructional Examples:

- When presented with five counters, the teacher asks the student to begin counting from five. “What number comes after 5? Let’s keep counting: 6, 7, 8, 9…”
- During a snack activity, the teacher says “We already have 3 grapes. Let’s count from 3 to see how many we will have if we add four more: 4, 5, 6, 7.”
- Students are helping set up for family conferences (parent-teacher conferences), and the teacher says “Let’s make sure we have enough cups for everyone. I have 24 cups in this stack, so if I add these cups (e.g., 6 more cups) how many do we have together? Let’s count on to find out.” Students count “…25, 26…30”. The teacher limits the activity to this expectation for this standard, but this could be expanded to a variety of standards once students have acquired these skills.

## IEFA Integration Example: Beadwork Patterns

### Context and Connection:

Beadwork is a significant art form among many Montana Indigenous tribes, with patterns often created using rows of beads. These patterns can involve repeating colors or shapes and are structured in sequences. Highlight the relevance of beadwork to specific Montana tribes, including its use in regalia, storytelling, and ceremonial items. Explain how counting accurately ensures the integrity of the pattern and connects to the traditions and skills passed down through generations. Be sure to include tribally specific information, as each tribe has unique cultural connections, histories, and ceremonies related to beadwork and that each artist expresses their artwork uniquely. It is worth noting that many tribes historically associate black beads and clothing with grief, and the teacher may want to avoid the use of this color within the task.

### Task:

The teacher should share local or tribally specific information about beadwork with students, perhaps through inviting a cultural knowledge keeper, images, or reading a book, such as “What’s in a Bead?” by Kelsey Borgford and Tessa Pizzale. Then, provide students with a partially completed beadwork pattern (physical or an image) with 10 beads already in place. Ask students to count on from 10 to determine how many beads are needed

to complete the next row in the pattern (e.g., 11, 12, 13…). Representations, such as actual beadwork patterns, ten frames, or representations of beadwork patterns using colored counters can be helpful aids in this activity.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources: EU1, EU2, and EU3.

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources: Contributions or Additive – Without context specific to a specific Tribe or Tribes, this task would achieve the "contributions" level. With context relating to tribally specific practices, beliefs, traditions, or stories, a slightly deeper depth and engagement might be engaged that would achieve the "additive" level.

## Relevant Resources:

- Tradition, Design, Color: Plateau Indian Beaded Bags from the Fred Mitchel Collection, Montana Historical Society
- Montana Man Shares Love of Beading, KTVQ News, YouTube
- Story Telling with Marcell & Lakota Designs in Beadwork with Leola, KOLC-TV, YouTube
- IEFA OPI – Model lesson plan for 4th grade – "I am Beading: Northern Cheyenne Bead Work"

## Proficiency Rubric Example:

1. **Beginning:** The student is **not yet able to** begin counting from a given number within a known sequence without **intensive support**.
2. **Developing:** The student **can** count beginning from a given number within a known sequence with **some support**.
3. **Proficient:** The student **can** count beginning from a number within the known sequence **with independence and accuracy**.
4. **Mastery:** The student **can** count beginning from a number within the known sequence **with independence and accuracy**. The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations.

# MT.K.CC.3:

**Write numbers from 0-20 and represent a number of objects with a written numeral 0-20.**

## General Notes:

This standard focuses on students' ability to write numerals from 0 to 20 and connect them to quantities of objects where 0 represents a count of no objects. It emphasizes both numeral formation and the understanding that numbers symbolize specific quantities.

## Instructional Examples:

- The teacher places 12 counters in front of the student and asks, “How many counters are there? Write the number that matches this group.”
- Students are exploring the classroom near the beginning of the year and searching for different types of items in the classroom (e.g., glue sticks, books with animals on the cover, tables, etc.). After identifying the objects, students count them and write the corresponding numeral (0-20). Consider providing pictures of the items and allowing students to tally as they count, especially if this is early in the learning process.
- The teacher has students write two numbers on cards (e.g., “5” and “13”) and asks the student to match the correct numeral to groups of objects (e.g., placing the "13" card next to a set of 13 blocks).

## IEFA Integration Example: Bison Herds

### Context and Connection:

The conservation of bison is a vital part of Montana’s natural heritage and deeply significant to many Indigenous Tribes in the state. In fact, each of the sovereign Tribal Nations manages its own herd of bison and contributes to the preservation of the species’ future. Teachers should explore the cultural and ecological importance of bison to specific Montana tribes, including their role in traditional life, ceremonies, harvest, songs, and stories. Early math concepts such as counting support tracking bison herd populations and help scientists and Indigenous communities monitor herd health, growth, and sustainability.

### Task:

The teacher should explore ways to share about the importance of the bison to Montana’s Indigenous Peoples, ensuring that students understand that each Tribe manages its own herd, and has its own traditions, stories, and ceremonies related to the species. Teachers should consider appropriate ways to share some of these traditions or stories, perhaps by inviting knowledge keepers or local herd managers, visiting a herd on a field trip, or sharing one of the resource videos provided below.

During the math tasks, students should be shown pictures or models of a bison herd grazing, such as images from the National Bison Range, managed by the Confederated Salish & Kootenai Tribes outside Charlo, MT, provided in the resources below. Students then count the bison in the herd and write the corresponding numeral to represent the total (e.g., “12 bison”). Physical representations, such as ten frames and counters, or printed pictures of bison, can be incredibly helpful for students to build comfort with this standard and task.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources:

EU 1, EU 3, EU 5, EU 6, and EU 7

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources:

Contributions or Additive – Without context specific to a specific Tribe or Tribes, this task would achieve the “contributions” level. With context relating to tribally specific histories, practices, beliefs, traditions, or stories, a slightly deeper depth and engagement might be engaged that would achieve the “additive” level.

## Relevant Resources:

- The Bison Range Activity Totes for Classrooms
- Buffalo, the Sélišˇ & Qlispé People and the Restoration of the Bison Range
- In the Spirit of ʔAtatíc̓eʔ The Untold Story of the National Bison Range (full version)
- A Brief History of the National Bison Range (short version)
- The Wild Buffalo Ride by the Indian Reading Series

## Proficiency Rubric Example:

1. **Beginning:** The student is **not yet able to** write numbers from 0-20 or represent a number of objects with a written numeral 0-20 without **intensive support**.
2. **Developing**: The student **can** write numbers from 0-20 **or** represent a number of objects with a written numeral 0-20 or can employ both skills with **some support**.
3. **Proficient:** The student **can** write numbers from 0-20 **and** can represent a number of objects with a written numeral 0-20 with **accuracy and independence.**
4. **Mastery:** The student **can** write numerals from 0-20 **and** represent quantities up to 20 with the corresponding numeral with **accuracy and independence.** The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards, by exceeding the developmental expectations, or by working beyond 20.

# MT.K.CC.4:

**Understand the relationship between numbers and quantities and connect counting to cardinality by recognizing that each successive number name refers to a quantity that is one larger within a normal counting sequence.**

## General Notes:

This standard emphasizes understanding the relationship between counting and the quantities those numbers represent. It requires students to recognize that each number in a counting sequence corresponds to one more object, reinforcing the concept of one-to-one correspondence and cardinality.

## Instructional Examples:

- The teacher places seven counters in front of the student and asks them to count one by one. After counting, the teacher asks, “How many counters are there?” The student responds, “7,” demonstrating that the last number said represents the total quantity.
- The teacher places five blocks in front of a student and asks them to count the total. Then, the teacher adds one more block and asks, “How many do we have now?” The student counts and identifies that the total is now 6, recognizing that adding one makes the group one larger.
- After a local harvest festival, the teacher provides a basket of items typically presented at the event (e.g., apples, pumpkins, chokecherries, etc.). Students count the number of items in the basket, then the teacher adds an additional item. Students recognize that the number of items should now be one more than before. The teacher limits the activity to this expectation for this standard, but this could be expanded to a variety of standards once students have acquired these skills.

## IEFA Integration Example: Bison Herds

### Context and Connection:

The conservation of bison is a vital part of Montana’s natural heritage and deeply significant to many Indigenous Tribes in the state. In fact, each of Montana’s Tribes manages its own herd of bison and contributes to the preservation of the species’ future. Teachers should explore the cultural and ecological importance of bison to specific Montana tribes, including their role in traditional life, ceremonies, harvest, songs, and stories. Early math concepts such as counting and cardinality support tracking bison herd populations and help scientists and Indigenous communities monitor herd health, growth, and sustainability.

## Task:

The teacher should find ways to share the importance of the bison to Indigenous communities with students by connecting tribally or locally specific places, histories, stories, traditions, or cultures to the math task. Examples might include sharing the video resources provided below, working with tribes to bring in herd management experts or knowledge keepers, or sharing a book written by Indigenous authors, such as “The Wild Buffalo Ride” by the Indian Reading Series, or “Brave Like the Buffalo” by Melissa Allan and Jadyn Fischer-McNab where appropriate.
The teacher shows a picture of a bison herd and asks students to count the bison.

- **Step 1:** The teacher places 8 bison figurines or images in front of the students in a scattered arrangement. Students count the bison one by one and identify the total (8), demonstrating an understanding of cardinality.
- **Step 2:** The teacher adds one more bison and asks the students to recount and determine how many bison are now in the group.
- **Step 3:** Students discuss how the total changes when one more is added, recognizing that the group becomes one larger (9).
- **Step 4:** The teacher could discuss the history of conservation efforts led by Tribal leaders in Montana, such as Atatice? and Susep Łatatí, the efforts of the American Bison Society, and the restoration of the Bison Range to tribal ownership in age-appropriate ways. They can connect this to the task by engaging students in a discussion about why it is important to understand how many bison are in the herd, and how numbers can support this understanding. The teacher can also relate herd management to other species and contexts in Montana, such as how the State and Tribes monitor deer, bear, moose, and other animal populations to monitor the health of species or determine how many hunting permits to issue.
- **Step 5:** Students could reflect on why monitoring the health of animals by counting the number of animals might be helpful, considering what they believe would happen if a population experienced a sudden drop or increase in numbers. Examples of questions might include: “Let’s think about why knowing how many bison remain might be important. What do you think would happen if scientists or game wardens counted and there were too many for the land?”, “What do you think would happen if there were only two left?”, “Can anyone think of other reasons we count animals?”, etc.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources:

EU 1, EU 3, EU 5, EU 6, and EU 7.

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources:

Additive, Transformation, or Social Action – Describing the specific efforts of Indigenous individuals, and providing opportunities to compare conservation efforts between Tribes would achieve the level of “additive”. Alternatively, engaging resources and reflection questions that allow

students to consider the perspectives of specific Tribes or Indigenous individuals, and draw connections to contemporary experiences activates a level of depth and engagement for learners that rises to the “transformation” level. While it may not be developmentally appropriate for all kindergarten learners, there is a possibility of reaching the “social action” level of the multicultural framework through exposure to differing perspectives.

## Relevant Resources:

- The Bison Range Activity Totes for Classrooms
- Buffalo, the Sélišˇ & Qlispé People and the Restoration of the Bison Range
- PBS Learning Media: The Mighty, Mighty Bison | San Diego Zoo Kids
- In the Spirit of ʔAtatíc̓eʔ The Untold Story of the National Bison Range (full version)
- A Brief History of the National Bison Range (short version)
- The Wild Buffalo Ride by the Indian Reading Series

## Proficiency Rubric Example:

1. **Beginning:** The student is **not yet able to** understand the relationship between numbers and quantities. They cannot connect counting and cardinality because they do not yet recognize that each successive number name refers to a quantity that is one larger without **intensive support.**
2. **Developing:** The student understands the relationship between numbers and quantities and are beginning to connect counting and cardinality by recognizing that each successive number name refers to a quantity that is one larger, **with some support.**
3. **Proficient:** The student understands the relationship between numbers and quantities, **and** they recognize that each successive number name refers to a quantity that is one larger **with independence and accuracy.**
4. **Mastery:** The student understands the relationship between numbers and quantities, **and** they recognize that each successive number name refers to a quantity that is one larger **with independence and accuracy**. The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations.

# MT.K.CC.5:

**Count to answer "how many?" in a variety of arrangements and, given a number, produce a set within 20.**

## General Notes:

This standard focuses on students' ability to count objects in various arrangements (e.g., line, circle, rectangular, scattered) to determine "how many" are in a group. It also includes the ability to create a set of objects to match a given number within 20.

## Instructional Examples:

- The teacher places eight counters in a straight line and asks, “How many counters are there?” The teacher then scatters the same eight counters on the table in a different arrangement and asks again, “How many counters do you see now?”
- The teacher gives a number card (e.g., “14”) to a student and asks them to build a set of 14 blocks. Afterward, the teacher asks the student to count the blocks aloud to confirm the total matches the card.
- The teacher provides the context that students would collect firewood for the winter, for a camping trip, or to donate to elders in the community (depending on local relevance). The teacher places small blocks, paper “logs” or pretzel sticks in front of the student in different arrangements (e.g., a pile, a line, a circle around a fire ring, etc.) and asks students to answer how many they “collected”. Students count the logs and state the total. The teacher then provides a number within 20 and asks students to show this number (e.g., “Mrs. Smith needs 12 logs delivered, can you bring me exactly 12?” or “Build a stack of eight logs the way your family might”, etc.).

## IEFA Integration Example: Giveaway Ceremony

### Context and Connection:

The Giveaway Ceremony is a tradition with unique expression among many Native American tribes, including those in Montana, where individuals or families distribute gifts to others in honor of someone or to commemorate a special event. This ceremony reflects the values of generosity and community. Preparing for the ceremony often involves counting and organizing gifts to ensure each recipient is honored. Each culture has traditions surrounding the types of gifts given, appropriate times for the ceremony, and more. Teachers wishing to incorporate this task might explore these traditions by partnering with local or tribally specific knowledge keepers or using the resources provided.

## Task:

The teacher might share clips from “Hidden Heritage – The Giveaway” by Paul LaRoche, invite a guest to their classroom with firsthand experience of a Giveaway, or briefly explain the purpose of the ceremony. Students should understand that a giveaway is not about giving presents like birthdays or winter holidays, but rather, it is about generosity, kindness, and the building of a strong community and inner spirit.

The teacher might then share the following context: at a pow-wow, an Elder is being honored during a Give Away Ceremony for their contributions to the community. The Elder wishes to give gifts to each of the dancers in the "tiny tot" children’s category and needs to ensure there are enough gifts for all participants.

It may be helpful to define the term “Elder”, from the Indigenous perspective, for students. One definition, from the Canadian Encyclopedia (2021), defines Elders as respected individuals in a community who preserve tribally-specific cultural knowledge and act as teachers, healers, advisors, counsellors, and a living connection to the past. An example of a kindergarten-friendly definition for an Elder may be: “Elders are special people in a community or family who know a lot about stories, traditions, and how to live. They help teach children, give advice, care for people, and keep the past alive for everyone so that traditional ways, stories, and knowledge is not lost forever.” It may be helpful to have students relate this to their own experiences as well, such as by asking “Who is a person in your life that acts like an elder?”

Once students are properly prepared to understand the context, the teacher should begin the task.

- **Step 1:** The teacher explains the Elder’s plan to honor the children for the joy they bring to the community by distributing gifts and presents a scenario where there are 12 children dancing in the tiny tot category. Students count the number of gifts prepared (e.g., toy blankets, stuffed animals, or other small items) to determine if there are enough for all 12 dancers.
- **Step 2:** If the total is not correct, students add or remove gifts to ensure there are exactly 12 to reinforce the skill of producing a set based on a given number.
- **Step 3:** The teacher scatters the gifts in different arrangements (e.g., in a circle or randomly on a table) and asks students to recount to confirm the total remains the same.

The teacher might wrap up the task by asking students to reflect on the following: “How does it feel to receive a gift?”, “How does it feel to give one?”, “Have you ever given something to someone who needed it more? How did that feel?”, “How do you or your family show generosity?”, “How do you show you are grateful when someone gives you a gift?”, or similar questions that reflect the values of generosity and gratitude.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources: EU 1, EU 2, EU 3, and EU 6.

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources: Additive or Transformation– Describing the specific experiences of Indigenous individuals, drawing connections between traditions associated with multiple Tribes, or including tribally specific resources would achieve the level of “additive”. Alternatively, engaging resources and reflection questions that allow students to consider the perspectives of specific Tribes or Indigenous individuals, and draw connections to contemporary experiences activates a level of depth and engagement for learners that rises to the “transformation” level.

## Relevant Resource:

- Your Guide to Understanding and Enjoying PowWows – OPI Indian Education for All Unit
- Montana Women’s History – Gifts of Love and Gratitude Belle Highwalking
- Hidden Heritage – Paul LaRoche – The Giveaway

## Proficiency Rubric Example:

1. **Beginning:** The student is **not yet able to** count to answer “how many” in multiple arrangements and cannot yet produce a set when provided with a number within 20 without **intensive support**.
2. **Developing:** The student **can** count to answer how many in a variety of arrangements **or** can produce a set when provided with a number within 20 or can employ both skills with **some support.**
3. **Proficient:** The student **can** count to answer how many in a variety of arrangements **and** can produce a set when provided with a number within 20 with **independence and accuracy**.
4. **Mastery:** The student independently **and** accurately counts to answer "how many?" for arrangements within 20 **and** can produce a set when provided with a number within 20 **with independence and accuracy**. The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards, by exceeding the developmental expectations, or by working beyond 20.

# MT.K.CC.6:

**Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group.**

## General Notes:

This standard focuses on comparing two groups of objects to determine whether one group has more, fewer, or the same number of objects as the other. Students use strategies such as counting, matching, and one-to-one correspondence to compare quantities and then describe the relationship using appropriate terms such as "greater than," "less than," or "equal to." Kindergarteners are not expected to use the symbols >, <, or = during an assessment of this standard.

## Instructional Examples:

- The teacher places 7 counters in one group and 5 counters in another. Students count the objects in each group and state, "7 is greater than 5."
- Students build towers with blocks. The teacher asks, "Which tower has more blocks? Which tower has fewer?"
- The teacher provides counter arrangements for two numbers (e.g., 10 and 20). Students compare the quantities, stating which is greater, less, or equal.

## IEFA Integration Example: Salish & Kootenai Huckleberry (Sťšă) Harvesting

### Context and Connection:

Many tribes in the Pacific Northwest and western Montana have harvested Huckleberries for generations. For instance, the Séliš (Salish), Qĩispé (Pend d'Oreille/Kalispel), and Ksanka (Kootenai) peoples of Montana have traditionally harvested huckleberries in late summer (August to September). Huckleberries are highly valued for their nutritional benefits and are often used in traditional recipes or preserved for winter. For some, harvesting this fruit is a practice that persists today that still emphasizes sustainable practices to ensure the plants remain abundant for future generations. Individuals collect berries in baskets or buckets, taking care to only gather what is needed and leaving enough for the ecosystem, wildlife, and future harvests.

## Task:

The teacher might show images of traditional or modern huckleberry harvests from local sources, or the USDA resource provided below. If regionally appropriate, a guest speaker might be invited to share their experiences harvesting or preserving huckleberries. Additionally, the teacher might show a video to students or read the book “We Share Our Gifts” by Georgia Smies, Annie McDonald, Lesli Anderson and Sierra Mahseelah Umphrey.

Once ready, students participate in a counting activity inspired by Salish and Kootenai huckleberry harvesting:

- **Step 1:** The teacher shares the context, perhaps asking guiding questions about why leaving berries on the plant for other animals might be important, whether students have ever gathered huckleberries or other foods before, etc. Then, the teacher sets up two groups of pretend huckleberries (e.g., counters, beads, or images of berries) to represent baskets collected by two family or community members. For example, one basket has 12 berries, and the other has 9.
- **Step 2:** Students count the berries in each basket and compare the quantities, determining which basket has more, which has fewer, or if they are equal. Note that visual tools like ten frames can serve as a great support for students in the context of this activity.
- **Step 3:** Students use comparative terms such as "greater than," "less than," or "equal to" to describe the relationship between the two groups.
- **Step 4:** The teacher may also share an image of berries on a huckleberry bush versus those in a basket. After asking the students to use comparative terms to describe the relationship between the values, students may be asked to provide their opinion about whether enough were left on the bush to ensure sustainability of the ecosystem and explore varied thinking across the classroom.

**Note:** In any activities involving the harvesting of native plants, teachers should make it very clear to students that they should not eat plants in the wild without confirming with an adult it is safe.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources:

EU 1, EU 2, EU 3 and EU 6.

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources: Additive or Transformation– Describing the specific experiences of Indigenous individuals, drawing connections between traditions associated with multiple Tribes, or including tribally specific resources would achieve the level of “additive”. Alternatively, engaging resources and reflection questions that allow students to consider the perspectives of specific Tribes or Indigenous individuals, and draw connections to contemporary experiences activates a level of depth and engagement for learners that rises to the “transformation” level.

## Relevant Resources:

- Huckleberry Harvesting of the Salish and Kootenai of the Flathead Reservation
- Recipe: Huckleberry and Apple-Barley Pudding – Salish Kootenai College
- We Share Our Gifts story by Georgia Smies, Annie McDonald, Lesli Anderson and Sierra Mahseelah Umphrey
- Picking Huckleberries with the Muckleshoot Tribe (Washington)
- USDA: A Social History of Wild Huckleberry Harvesting in the Pacific Northwest

## Proficiency Rubric Example:

1. **Beginning**: The student is not yet able to identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group without **intensive support**.
2. **Developing:** The student can identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group with **some support**.
3. **Proficient:** The student **can** identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group **with independence and accuracy**.
4. **Mastery:** The student **can** identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group **with independence and accuracy**. The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations.

# MT.K.CC.7:

**Compare two numbers between 1 and 10 presented as written numerals.**

## General Notes:

This standard focuses on students' ability to compare two written numerals between 1 and 10 and determine which is greater, which is less, or if they are equal **without** the use of manipulatives, drawings, or other forms of representation. This skill builds the foundation for understanding relationships between numbers and prepares students for future work with number lines, inequalities, and operations.

## Instructional Examples:

- The teacher provides the students with two written numerals (e.g., "6" and "3") and asks the student to compare them. The student responds by comparing the two numerals, such as, "6 is greater than 3" or "3 is less than 6." In Kindergarten, students may sometimes use less-formal language, such as, "6 is bigger." Teachers should positively reinforce the response while introducing correct mathematical vocabulary (e.g., "That's right! 6 is greater than 3!").
- The teacher provides a picture of two lunch trays with a written numeral card corresponding to the number of food items on the tray. Students read the numbers and compare them (e.g., "The tray on the right has more food items than the tray on the left.")
- During the introduction of this concept, a teacher might start by providing pictures to accompany the numeral (a developing level task). They may provide two groups of animal tracks by a riverbank (e.g., deer, bear, racoon, etc.) and provide numeral labels (e.g., 7 and 4). The teacher may ask "Which animal left more tracks? How do you know?". Students can provide a variety of responses (e.g., "The deer left more tracks than the bear because 7 is more than 4.) This could be connected to realistic locations that students may be familiar with to add local relevance.

## IEFA Integration Example: Written Numerals

### Context and Connection:

Many Montana tribes, such as the Assiniboine (Nakoda), Newe/Neme (Shoshone Bannock), and Niitsitapi/Pikuni (Blackfeet), use the same Hindu-Arabic numeral system familiar to students in public schools. However, these languages often have unique ways of expressing cardinal and ordinal numbers, reflecting cultural and linguistic traditions. For example, numbers may be embedded in storytelling or used in traditional contexts like trade or hunting. Numbers are spoken differently across languages but still represent the same quantities when written using Arabic numerals. For example, the Blackfeet word for "five" is *nisitó* and "eight" is *náánisoyi,* while written as "5" and "8", in Arabic numerals. It is important to mention to students that Tribal nations have distinct languages and can have unique dialects within a group as well, just as English has unique expressions across the globe. This activity helps students understand that while the numeral system is shared, the language and cultural significance of numbers differ across Montana tribes and global communities. This fosters respect for linguistic diversity and highlights the global universality of mathematical concepts.

| | | | | |
|---|---|---|---|---|
| ni'tókskaa 1 | nioókska 3 | nisitó 5 | ihkitsik 7 | piihkssó 9 |
| nááto'k 2 | niisó 4 | náao 6 | náánisoyi 8 | kiipó 10 |

Source: Piikani Language Pocket Dictionary – BCC/NTA

## Task:

The teacher provides two written numerals (e.g., “8” and “5”) and asks students to compare them while introducing a cultural connection. The teacher explains: “The Blackfeet people use numbers in their language for counting things just like many other cultures. Traditional examples might include counting the number of antlers harvested. Modern examples might include counting the number of chairs to set out for family dinner. If someone collected this many (points to 8) antlers and someone else collected this many (points to 5), which is more? Which is less?”

Students compare the written numerals and respond, “8 is greater than 5,” or “5 is less than 8.” If integrating an emphasis on language, students might also practice responding using the Blackfeet words for numerals, such as “náánisoyi” is greater than “*nisitó.”* Modeling this using physical methods such as holding up fingers, tapping the number, or drawing the numeral may help students connect the word to the concept of the number.

Teachers may also choose to spend time explaining why saving Native languages is important, and describing, in age-appropriate terms, how Native peoples were banned during the boarding school era from using their languages (e.g., “there was a time where Indigenous children weren’t allowed to speak the languages they spoke with their families”). An accessible way to explain the diversity of tribal languages to kindergarteners may be to explain that if every child in the class belonged to a different tribe, they would all speak a different language.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources: EU 1, EU 3, EU 5, and EU 6.

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources: Additive or Transformation– Describing the specific experiences of Indigenous individuals, drawing connections between traditions associated with multiple Tribes, or including tribally specific resources would achieve the level of “additive”. Alternatively, engaging resources and reflection questions that allow students to consider the perspectives of specific Tribes or Indigenous individuals, and draw connections to contemporary experiences activates a level of depth and engagement for learners that rises to the “transformation” level.

## Relevant Resource:

- University of Montana – Blackfoot Language Group
- The Piegan Institute
- Piegan Institute and Native Teaching Aids – Blackfoot Language Dictionary
- Book - Piikani Language Pocket Dictionary – BCC/NTA

## Proficiency Rubric Example:

1. **Beginning**: The student is **not yet able to** compare two written numerals between 1 and 10 without **intensive support**.
2. **Developing**: The student **can** compare two written numerals between 1 and 10 **with some support.**
3. **Proficient**: The student **can** compare two numbers between 1 and 10 when presented as written numerals **with independence and accuracy.**
4. **Mastery**: The student **can** compare two numbers between 1 and 10 when presented as written numerals **with independence and accuracy.** The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations.

# MT.K.OA.1:

**Represent addition and subtraction in multiple ways.**

## General Notes:

This standard focuses on students' ability to represent addition and subtraction using a variety of methods, such as objects, drawings, fingers, verbal explanations, sounds, acting out scenarios, or writing expressions or equations. Representing addition and subtraction in multiple ways builds conceptual understanding, flexibility in problem-solving, and prepares students for formal operations in later grades. Note that the expectation of this standard is to represent addition and subtraction, not to evaluate. Evaluation of these problems would combine this standard with others.

## Instructional Examples:

- The teacher places three counters on a table and adds two more. They ask, “How can we show what just happened?” and the student represents addition by grouping and verbalizing “3 plus 2”, by drawing a picture of three dots and adding two more dots, using their fingers to show three fingers, then two fingers, writing the equation “2 + 3”, or representing addition in any other way.
- The teacher draws six carrots on the board, representing a garden plot. They say, “Imagine we picked two of the carrots from the garden, how can we show what happened?” The students represent subtraction by crossing out 2 carrots in the drawing, saying “6 take away 2”, writing “6 – 2”, or representing subtraction in other ways.
- The teacher provides students with one representation (e.g., a drawing of 3 items and adds 4 items) and asks students to represent what is happening in two other ways. The students say, “three plus 4,” write “3 + 4,” use their fingers to show adding three and four, or any other combination of representations that accurately depict the addition situation.

## IEFA Integration Example: Jingle Dancer by Cynthia Leitich-Smith

### Context and Connection:

In *Jingle Dancer*, the main character, Jenna (Muscogee (Creek)) collects rows of jingles for her jingle dress to prepare for an upcoming powwow. The story emphasizes the values of generosity, community, cultural participation, and ceremonial preparation within Native communities. This activity connects subtraction to a meaningful cultural story. Educators can also use this book to discuss the contemporary significance of tribally specific and unique traditional dances for many Native peoples by highlighting the role they play in reclaiming and celebrating traditions and practices that were once banned by sharing: “A long time ago, some people tried to stop Indigenous Peoples from doing their dances and ceremonies. But families worked hard to keep these traditions alive, and today, they still dance to honor who they are. Powwows aren’t just ceremonial gatherings – they also serve as spaces for connection and bringing together people from within and across Tribal communities.”

## Task:

- The teacher reads the story *Jingle Dancer* by Cynthia Leitich-Smith and pauses before the last line on page 12 (where Jenna visits Mrs. Scott). The teacher explains that Jenna needs 4 rows of jingles for her dress, but she currently has 2 rows collected. The teacher asks the students, "How can we show how many rows of jingles Jenna still needs?" Students create their own representations. The teacher invites students to share how they represent the number of jingles Jenna still needs.
- The teacher can ask this question at multiple points throughout the book, as Jenna's family share more rows with her.
- To extend practice, students might be presented with multiple contextual problems such as "Jenna needs 10 jingles. She has 6, how many more does she need?", "Jenna's grandma gives her 3 jingles, and her aunt gives her 5. How many jingles does Jenna have total?", etc.
- To extend, the teacher might consider asking questions such as "Why might it be important for Jenna and others to dance today?", "How does this story show strength and community?", or "Can you think of a time when someone in your life helped you do something that was important to you? What did they do, and how did it make you feel?"

**Note:** Every school in Montana has been provided with a copy of the book Jingle Dancer. Teachers should check their library before purchasing copies.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources:

EU 1, EU 2, EU 3, EU 5, and EU 6.

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources: Additive or Transformation– Describing the specific experiences of Indigenous individuals, drawing connections between traditions associated with multiple Tribes, or including tribally specific resources would achieve the level of "additive". Alternatively, engaging resources and reflection questions that allow students to consider the perspectives of specific Tribes or Indigenous individuals, and draw connections to contemporary experiences activates a level of depth and engagement for learners that rises to the "transformation" level.

## Relevant Resources:

- Model Teaching Units ELA Volume 1– OPI IEFA
- National Council of American Indians – The History of the Jingle Dress Dance
- PBS – The Jingle Dress Tradition

## Proficiency Rubric Example:

1. **Beginning**: The student is **not yet able to** represent addition and subtraction in multiple ways without **intensive support**.
2. **Developing**: The student **can** represent addition **or** subtraction in multiple ways, **or** the student can represent addition and subtraction in one way, **or** the student can engage in all skills **with some support.**
3. **Proficient**: The student can represent addition **and** subtraction in multiple ways **with independence and accuracy**.
4. **Mastery**: The student **can** represent addition **and** subtraction in multiple ways **with independence and accuracy**. The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations.

# MT.K.OA.2:

**Solve addition and subtraction problems in context within 10. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities.**

## General Notes:

This standard focuses on students solving addition and subtraction problems within 10 using meaningful contexts. Incorporating cultural context relating to Montana Indigenous Peoples and local communities provides opportunities for students to see math as relevant and connected to their lived experiences, the land they live on, and the communities they to which they belong.

## Instructional Examples:

- The teacher says, “A rodeo is happening in a local community, there are 7 horses in a corral. Ryan and Skylar take their horses out of the corral to compete in team roping. If two horses were removed, how many are left?” Students solve the problem, using any appropriate representation, to determine that there are four horses remaining.
- The teacher shares a scenario: “You and your friends are building snowmen in the yard. First, you build three snowmen. Then, you decide to build two more. How many snowmen did you build total?” Students express, using any appropriate representation, that there were five snowmen built.
- The teacher shares the class that is helping clean up main street. They share that in the morning, three classes helped pick up trash around the park and after lunch, four classes helped clean up by the library. The teacher asks, “How many classes helped in all?” The teacher might write the expression “3 + 4” on the board to support this connection and students answering, “Seven classes helped clean up.”

## IEFA Integration Example: Elk Morning Counts His First Coup by A.J. Otjen, et al.

### Context and Connection:

In *Elk Morning Counts His First Coup* by A.J. Otjen, Sabrena Half, Bessie Stopsatprettyplaces, Salisha Old Bull, Zackery Birdfaraway and Larry Old Lake, Elk Morning must complete four courageous deeds to become a warrior. This book accurately depicts histories and traditions of the Apsáalooke (Crow) people. Teachers can read this story to their class and ask mathematical questions relating to the context. Teachers seeking to learn more about the cultural meaning of the counting coup process may be interested in reading the book *Counting Coup* by Dr. Herman J. Viola and Joseph Medicine Crow, which serves as the inspiration behind the children’s book in this task.

## Task:

The teacher will begin by reading the book *Elk Morning Counts His First Coup* to the class.

At certain points, the teacher will ask students mathematical questions such as:

- Elk Morning saw a horse in the sky with a circle around his eye, four lines on his cheek, a lightning bolt on his leg, a horse track on his shoulder, and a handprint on its rump. How many symbols were painted on the horse's hide total?
- Elk Morning has four friends join him on his journey to earn his first coup. How many people go on the trip together?
- Elk Morning and his four friends all ride horses to the rival camp. How many people and horses went in total?

Students may show addition in many ways and should be encouraged to explore diverse methods of solving and representing the problem. Examples might include ten frames, counters, tally marks, number sentences, etc. depending on the students' abilities and time of year instruction takes place. Students might also deploy a number of addition strategies, such as counting the items that appear once and adding four after, or other strategies such as counting on, etc.

To extend the lesson, and provide examples involving subtraction, the teacher may provide contexts where horses are being gained by one band or removed from a rival camp. For example: "One band has 8 horses in its camp, but three go missing in the night. How many are left?"

Students could again represent these problems in multiple ways, such as by drawing pictures, writing number sentences, using fingers or tallies, ten frames, counters, small horse figurines, or any number of methods. To increase connectivity between concrete, physical examples and the abstract idea of subtraction, be sure to encourage the writing of numerals and symbols to form number sentences, with support if needed.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources:

EU 1, EU 2, EU 3, and EU 6.

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources: Additive or Transformation– Describing the specific experiences of Indigenous individuals, drawing connections between traditions associated with multiple Tribes, or including tribally specific resources would achieve the level of "additive". Alternatively, engaging resources and reflection questions that allow students to consider the perspectives of specific Tribes or Indigenous individuals, and draw connections to contemporary experiences activates a level of depth and engagement for learners that rises to the "transformation" level.

## Relevant Resources:

- OPI IEFA – Model Teaching Unit – Elk Morning Counts His First Coup (Grade 1)
- Billings Gazette – Montana History Minute: Counting Coup Led to Honor in Plains Tribes

## Proficiency Rubric Example:

- **Beginning**: The student is **not yet able to** solve addition and subtraction problems in context within 10 without **intensive support**.
- **Developing**: The student **can** solve addition **or** subtraction problems in context within 10 or can employ both skills **with some support.**
- **Proficient**: The student **can** solve addition **and** subtraction problems in context within 10 **with independence and accuracy**.
- **Mastery**: The student **can** solve addition and subtraction problems in context within 10 **with independence and accuracy.** The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations.

# MT.K.OA.3:

**Decompose numbers less than or equal to 10 into pairs in multiple ways.**

## General Notes:

This standard focuses on students' ability to break down (or decompose) numbers less than or equal to 10 into pairs in different ways. It emphasizes the concept that a single number can be represented as the sum of two smaller numbers in multiple combinations. This foundational skill builds students' understanding of addition, number relationships, and flexibility in problem-solving. Representing decompositions using objects, drawings, physical objects, expressions, or equations helps students visualize and explore the many ways numbers can be combined.

## Instructional Examples:

- The teacher gives students 8 counters and asks, "Can you show me two groups that make eight?" A student might separate the counters into 5 and 3. The student says, "Five and three make eight." The teacher then asks, "Can you find another way?" The student may then separate the tiles into other groups, such as 2 and 6 or 4 and 4.
- The teacher shows the students a dot talk activity, "Can you divide these dots into two groups?" One student might draw circles around the dots, grouping 3 on one side and 4 dots on the other together, then says "three and four makes seven," another student may draw circles around 2 dots and then 5 dots and say, "two and five makes seven". Other students may still present other representations.
- The teacher writes the number 9 on the board and asks students "Can you show numbers that add to 9?" Students might write equations such as 5 + 4 = 9, 6 + 2 + 1 = 9, or may represent these using pictures, objects, their fingers, or other visualizations.

## IEFA Integration Example: Beading Patterns

### Context and Connection:

Beading is a significant cultural tradition for many Montana Indigenous Peoples. It incorporates mathematical ideas such as symmetry, geometry, and number patterns. Beadwork designs can reflect individual creativity and tribally specific styles. While traditional items like moccasins and regalia remain important mediums, many artists also apply these traditions in contemporary contexts—creating beaded earrings, lanyards, hats, and more. It is worth noting that many communities associate black beads and clothing with mourning, so teachers may want to avoid using this color in the classroom, given the context may not be appropriate within this task.

## Task:

The teacher might begin by showing students examples of beadwork designs from a local or Montana Tribe, or from many Tribes across Montana. They may also have local knowledge keepers or beadwork artists share a bit about their experiences with students or read the story “What’s in a Bead” by Kelsey Borgford and Tessa Pizzale.

Students engage in a beading-inspired activity to decompose numbers. The teacher gives students the following scenario: “You are creating a beading pattern for a bracelet. You need 10 beads in each row. How can you arrange the beads into two different colors to complete the row?" A student might represent 10 as 5 red beads and 5 blue beads, or 6 red beads and 4 blue beads, etc. The teacher asks, “Can you find another way to arrange the beads?” Students might discover combinations such as 7 red and 3 blue. The teacher may extend this activity by giving each student the same finite number of beads and inviting them to create their own unique patterns. Because traditional beadwork beads may be challenging for young children to work with, due to their size, teachers may choose to use craft beads or counters to represent beads. If using beads, students could arrange these on pipe cleaners to make their own bracelets. Alternatively, students could use ten frames and counters to make patterns. Afterward, students share and describe how their designs reflect their individuality. As students observe each other’s work, they reflect on how—despite starting with the same materials—each person created something different. This opens space to discuss how art, culture, and math can all be expressions of identity and perspective.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources: EU 1, EU 2, EU 3.

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources: Contributions or Additive – Without context specific to a specific Tribe or Tribes, this task would achieve the “contributions” level. With context relating to tribally specific practices, beliefs, traditions, or stories, a slightly deeper depth and engagement might be engaged that would achieve the “additive” level.

## Relevant Resources:

- Tradition, Design, Color: Plateau Indian Beaded Bags – Montana Historical Society
- A Life in Beads – National Museum of the American Indian
- KOLC-TV – Story Telling with Marcell & Lakota Designs in Beadwork with Leola One Feather and Marcell Bull Bear

## Proficiency Rubric Example:

1. **Beginning**: The student **is not yet able to** decompose numbers less than or equal to 10 into pairs in multiple ways without **intensive support**.
2. **Developing**: The student **can** decompose numbers less than or equal to 10 **with some support** or can independently find one way to decompose a number.
3. **Proficient**: The student **can** decompose numbers less than or equal to 10 into pairs in multiple ways **with independence and accuracy.**
4. **Mastery**: The student **can** decompose numbers less than or equal to 10 into pairs in multiple ways **with independence and accuracy**. The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations.

# MT.K.OA.4:

**For any number from 1 to 9, find the number that makes 10 when added to the given number.**

## General Notes:

This standard focuses on helping students develop fluency with combinations that make 10, which is foundational for understanding place value and strategies for addition. Students typically practice finding the number that, when added to a given number from 1 to 9, results in 10. This involves using manipulatives, drawings, or mental math to visualize and compute the missing part, recording the answer in some way, such as with a drawing or equation. Mastery of this skill helps students build number sense and prepares them for more complex operations in later grades.

## Instructional Examples:

- The teacher gives the student 7 counters and a total of 10 spaces on a ten frame. The teacher asks, “How many more counters do we need to make 10?”
- The teacher provides a number line from 0 to 10 and places a marker on 8. The teacher asks, “How many more steps do we need to get to 10?”
- The teacher tells a story: “You have 5 balloons, and you want to have 10 balloons for a party. How many more balloons do you need?”. Students use their own strategies to answer the question.
- The teacher writes an incomplete equation on the board: “7 + ___ = 10” and asks the student to find the missing number.

## IEFA Integration Example: Traditional Foods

### Context and Connection:

Traditional foods and medicinal plants, such as natural herbs, berries, corn, or dried meat, are historically significant in the diets and ceremonies of Montana Indigenous Peoples. For some Indigenous Peoples and families, these traditions carry on today. The preparation of traditional foods, such as how dried meat is preserved for the winter or shared at community gatherings and ceremonies is a context with historical and contemporary applications that have unique expressions within communities and families. Students can also explore how counting ensures that food is distributed fairly. These foods are often gathered, prepared, and shared, and can be done so in specific quantities which provides a relevant context for exploring mathematical concepts like combinations that make 10.

## Task:

The teacher should share the context of drying meat with students, perhaps by showing images of traditional or modern harvests. Students should understand that traditional foods are unique to each community, culture, and sometimes families. They may be asked reflective questions such as, “Are there any special foods your loved ones make?” to build connections to their own lived experiences.

Once students are ready, the teacher will bring in the context of dried meat by providing the scenario: "You are helping to prepare dried meat for a traditional meal. You need exactly 10 strips of meat on each plate. One plate already has 4 strips. How many more strips do you need to add?" Students use manipulatives (e.g., small craft sticks to represent meat strips) or drawings to represent the 4 strips on the plate. They then add strips until the total equals 10 and state, “I need 6 more strips.” The teacher asks, “Can you show this as an equation?” Students should practice writing equations to accompany their representations. Depending on the time of year, and students’ comfort level, it may be beneficial to incorporate ten frames as a supportive tool.

Many schools across Montana host annual meat drying activities with Indigenous knowledge keepers or Tribal Departments of Education, incorporating traditional recipes, and providing opportunities for students to see traditional practices in action. If your school is interested in extending this activity in this manner, reach out to the IEFA team at OPI, or local resources for further guidance.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources: EU 1, EU 3

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources: Contributions, Additive, or Transformation – Without context specific to a specific Tribe or Tribes, this task would achieve the “contributions” level. With context relating to tribally specific practices, beliefs, traditions, or stories, a slightly deeper depth and engagement might be engaged that would achieve the “additive” level. Connecting this task with a school event where students learn about the specific practices, traditions, and histories of meat drying from Knowledge Keepers, drawing connections to contemporary experiences, activates a level of depth and engagement for learners that rises to the “transformation” level.

## Relevant Resources:

- Traditional Foods Recipes – Montana Cardiovascular Health Program
- OPI IEFA – Traditional Foods: A Native Way of Life
- Montana No Kid Hungry – Traditional Foods in Montana School Meals
- Curtis, Edward S, photographer. Drying meat - Flathead. , ca. 1910. Photograph. Retrieved from the Library of Congress

## Proficiency Rubric Example:

1. **Beginning**: The student is **not yet able to** determine the number that makes 10 when added to a given number without **intensive support**.
2. **Developing**: The student **can** determine the number that makes 10 when added to a given number **with some support**.
3. **Proficient**: The student **can** determine the number that makes 10 when added to a given number **with independence and accuracy**.
4. **Mastery**: The student can determine the number that makes 10 when added to a given number **with independence and accuracy**. The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations.

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# MT.K.OA.5:

**Flexibly and accurately add and subtract within 5.**

## General Notes:

This standard emphasizes the ability to add and subtract within 5 with accuracy and flexibility. Accuracy ensures that students consistently find correct solutions, while flexibility involves solving problems using various strategies, such as manipulatives, drawings, mental math, or equations. Developing both skills allows students to approach problems in multiple ways and adapt to different contexts. Instruction often focuses on hands-on, interactive activities that encourage exploration and reinforce understanding of addition and subtraction relationships.

## Instructional Examples:

- The teacher provides students with 3 counters and asks, “If you add 2 more counters, how many do you have now?” The student solves the problem (3 + 2 = 5) using any strategy. (e.g., writing an equation, drawing a picture, using their fingers, using mental math, etc.)
- The teacher tells a story: “You have 5 apples, but you give 3 to your friends. How many do you have left?” The student uses any strategy to determine that 5 - 3 = 2.
- The teacher shows a group of 2 blocks and a group of 3 blocks. They ask, “If we put these together, how many blocks do we have?” Then, “If we start with all the blocks and take away 2, how many do we have left?” The student answers 2 + 3 = 5 and 5 - 2 = 3, demonstrating flexibility in using the same numbers in addition and subtraction.
- The teacher writes two equations on the board (e.g., 1 + 4 = ___, 5 - 3 = ___) and asks students to solve them using a different method for each. (e.g., mental math, fingers, or manipulatives, etc.).

## IEFA Integration Example: Basketball

### Context:

Basketball is a popular sport among many Montana communities, including Montana Indigenous communities. It is played recreationally, in schools, and in tournaments. It fosters teamwork, strategy, and physical activity. Many annual events in Indigenous communities, such as Crow Fair, the Arlee Celebration, the Kiyiyo Powwow, and beyond host basketball tournaments or shooting competitions. These events are a popular part of celebrations because of their ability to bring together players and spectators from the local and wider community. Basketball can also serve as a context for mathematical thinking, including counting, addition, and subtraction.

## Task:

The teacher introduces a basketball-themed activity and discusses the importance of the shooting competitions as a celebration of culture and community to many tribes. To increase the connection for students, the teacher may explore whether events, such as powwows, hold such tournaments annually in or near the local community.

Students can explore how basketball has become a modern tradition at many powwows and community events, connecting cultural events to everyday experiences and math skills like keeping score or counting attempts: "At the [Insert appropriate event] basketball shooting competition, your team is allowed to attempt five shots. First, you make 2 baskets. How many shots do you have left?" Students subtract 2 from 5 using manipulatives (e.g., small basketball-themed counters), drawings, or mental math to find the answer. "On your next turn, you make 1 more basket. How many baskets have you scored in total?" Students add to determine the total.

The teacher might consider extending the activity by asking questions that have students reflect on the nature of traditions, such as “Why do you think basketball became such a big part of cultural events like powwows?”, “How do traditions grow and change over time?”, or “What is your favorite tradition of your family or our community? What makes it a tradition?”. Alternatively, the teacher might take students into the school gym or use a trashcan or small basketball hoop to have students model the scenarios physically.

For extended practice, the teacher could provide a worksheet of examples involving addition and subtraction within 5 for students to worth through.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources: EU 1, EU 2, EU 3.

## Multicultural Approach:

Additive or Transformation– Describing the specific experiences of Indigenous individuals, drawing connections between traditions associated with multiple Tribes, or including tribally specific resources would achieve the level of “additive”. Alternatively, engaging resources and reflection questions that allow students to consider the perspectives of specific Tribes or Indigenous individuals, and draw connections to contemporary experiences activates a level of depth and engagement for learners that rises to the “transformation” level.

## Relevant Resources:

- Montana PBS – Native Ball: Legacy of a Trailblazer
- Montana State University – Experts say basketball enlivens old traditions on contemporary reservations
- Small Number and the Basketball Tournament (story)

## Proficiency Rubric Example:

1. **Beginning**: The student is **not yet able to** flexibly and accurately add and subtract within 5 without **intensive support**.
2. **Developing**: The student **can** add **or** subtract within five with flexibility **or** accuracy, **or** the student can engage all skills **with some support**.
3. **Proficient**: The student **can** flexibly **and** accurately add **and** subtract within 5 **with independence.**
4. **Mastery**: The student **can** flexibly **and** accurately add and subtract within 5 **with independence**. The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations.

# MT.K.OA.6:

**Recognize the characteristics of the commutative property in addition.**

## General Notes:

This standard focuses on students identifying that the order in which numbers are added does not affect the sum. This is known as the commutative property of addition (a + b = b + a). While students are not expected to formally name or define the property at this level, they should begin to notice patterns and relationships, such as understanding that 3 + 2 produces the same result as 2 + 3. This builds a foundation for flexible thinking and algebraic reasoning in later grades such as flexibly adding three numbers. Instructors should use the vocabulary "commutative property of addition," along with concrete examples, manipulatives, and simple activities to help students explore and observe this property in developmentally appropriate ways.

## Instructional Examples:

- The teacher provides 3 red counters and 2 clear counters and asks, "How many counters do we have altogether?" Students count the total and state, "3 + 2 = 5." The teacher then switches the order of the counters, placing the 2 clear counters first and the 3 red counters second, and asks, "How many counters now?" Students observe that the total remains the same and state, "2 + 3 = 5." Students recognize that the total is still 5 and discuss how switching the order doesn't change the sum.
- The teacher draws a picture of 1 pencil and 2 erasers and asks students to count the total. Students write the equation: 1 + 2 = 3. The teacher then draws 2 erasers and 1 pencil and asks, "What do we get this time?" Students recognize that the total is still 3 and write the equation: 2 + 1 = 3.
- The teacher writes two equations on the board: 4 + 1 = ___ and 1 + 4 = ___. The teacher asks students to solve both and discuss what they notice. The student observes" "The total is the same even though the numbers are switched!"

## IEFA Integration Example: Coyote Packs

### Context and Connection:

Many Indigenous cultures across the U.S. and Montana have traditional stories that feature Coyote. Some feature Coyote as a trickster, others as a creator that shapes the land, and its people and others tell stories of Coyote as a hero. Teachers should explore tribally specific traditions and stories to determine appropriate contexts to share with students. Traditional stories are often shared at specific times of the year, typically wintertime, depending on the Tribe. For this reason, educators are encouraged to check with Elders, cultural committees, or knowledge keepers to ensure appropriateness of sharing traditional stories. Seven Tribal Nations Fish and Game Departments operate in Montana: the Blackfeet, Chippewa Cree, Confederated Salish & Kootenai, Crow, Northern Cheyenne, and the Fort Peck and Fort Belnap Tribes (Montana, 2014). These organizations work to

enforce fish and wildlife laws, manage natural resources and animal populations, and educate the public. This task blends the context of traditional stories with modern wildlife management practices that Tribes in Montana engage in. The coyote is not a protected species in Montana, and populations are not monitored.

## Task:

The teacher introduces the coyote as an animal with significance to Tribes in Montana. They may share a specific traditional story, if appropriate, or they may describe the role Coyote takes in stories told by a specific Tribe. The teacher might show pictures of coyotes, play audio of their calls, describe their habits, and the importance of managing the population. This task may provide a powerful opportunity for career applications, especially if a Fish and Game Warden or environmental scientist from the area can visit the classroom.

The teacher then sets up a scenario inspired by a coyote management issue: "Imagine the Fish and Game are studying a small coyote pack that has been appearing on a rancher's land. One warden spots three members of the pack in a field and another spots two more coyotes near town. How many coyotes are there in total?".

Students should be given space to try multiple strategies to solve the problem. For example, they may choose to represent the problem visually, with pictures, counters, tallies, or other methods, physically, by using their fingers, symbolically, by writing the equation 3 + 2 = 5, or so on. Once students have had time, the teacher should consolidate understanding across the class by showing the many ways this situation could be represented. Then, continue: "Now, let's imagine that the three coyotes move from the field to property near town and the two other coyotes move from town to the field. How many coyotes are there now?" Students solve the problem again and state, "2 + 3 = 5."

Students can represent and express their understanding in multiple ways, including an equation, drawing, using manipulatives, etc. The teacher asks, "What do you notice about the total number of coyotes? Does it change when the groups change their location?" Students observe that the total stays the same no matter the order and discuss the broader implications of adding. The teacher can connect the task to modern management and environmental efforts, sharing how scientists use a similar practice when they study an animal population.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources: EU 1, EU 3, EU 4, EU 7.

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources: Additive or Transformation– Describing the specific experiences of Indigenous individuals, drawing connections between traditions, policies, or stories associated with multiple Tribes, or including tribally specific resources would achieve the level of "additive". Alternatively, engaging resources and reflection questions that allow students to consider the perspectives of specific Tribes or Indigenous individuals, and draw connections to contemporary experiences activates a level of depth and engagement for learners that rises to the "transformation" level.

## Relevant Resources:

- Montana Field Guide – Coyote – Canis Latrans
- Montana Fish, Wildlife, & Parks – Coyote – Canis Latrans
- MT OPI – When to Tell Coyote Stories – Louis Adams
- MT OPI – Resources Sent to School Libraries List: The Bob-Tailed Coyote (Cheyenne), Coyote Stories of the Montana Salish Indians (Salish), Coyote and the Man Who Sits on Top (Salish), Coyote and the Mean Mountain Sheep (Salish), Beaver Steals Fire: A Salish Coyote Story (Salish).

## Proficiency Rubric Example:

1. **Beginning**: The student is **not yet able to** recognize the characteristics of the commutative property in addition without **intensive support**.
2. **Developing**: The student **can** recognize the characteristics of the commutative property in addition **with some support**.
3. **Proficient**: The student **can** recognize the characteristics of the commutative property **with independence and accuracy**.
4. **Mastery**: The student **can** recognize the characteristics of the commutative property **with independence and accuracy**. The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations.

# MT.K.NBT.1:

**Compose and decompose numbers from 11-19 into ten ones and further ones in multiple ways and record each composition or decomposition by a drawing or an equation.**

## General Notes:

This standard focuses on students understanding numbers 11-19 as being composed of ten ones and additional ones (e.g., 13 is 10 + 3). It introduces the concept of place value by emphasizing the role of "ten" as a unit. Students practice composing and decomposing these numbers in multiple ways, such as using drawings or objects to represent their understanding. This skill builds a bridge between early counting and more formal place value concepts in later grades.

## Instructional Examples:

- The teacher provides students with base ten blocks and asks them to represent the number 14. The student takes one "ten" rod and four "one" cubes, saying, “14 is 10 and 4.” The teacher asks the student to write the equation: 14 = 10 + 4.
- The teacher provides students with two ten frames and asks them to represent the number 17. The student fills one ten frame completely and places 7 counters in the second ten frame. The teacher asks the student to explain their representation: “17 is 10 ones and 7 more.”
- The teacher writes the number 18 on the board and asks students to write an equation or picture that shows how 18 can be made with tens and ones. Students write 18 = 10 + 8, 10 + 8 = 18, or draws a picture of the situation showing one group of ten and one of eight.

## IEFA Integration Example: Harvesting Camas

### Context and Connection:

Montana and Pacific Northwest Indigenous Peoples, such as the Qĺispé (Pend d'Oreille/Kalispel), Séliš (Salish), Nimíipuu (Nez Perce), and Niitsitapi/Pikuni (Blackfeet), traditionally and contemporarily gather and harvest plants like camas bulbs for food. Camas harvesting involves knowledge passed down across generations, including how to locate, gather, process, and cook the bulbs sustainably. The teacher might also explain how camas harvesting was historically done with great care to preserve opportunities for future growth and how modern farming, construction, and land use have reduced access to many of the traditional harvesting areas. Students can discuss how grouping (e.g., placing bulbs in pouches) reflects efficiency and planning in real-life harvesting in this activity.

## Task:

The teacher should set up the lesson by showing images of the camas plant and bulbs to students, having a guest speaker join the class, reading a book about camas by an Indigenous author, or sharing a video or other resource relevant to the context. The teacher should also mention that it is becoming more challenging for camas harvesters to access traditional harvesting sites. Some reasons, provided in the documentary Camas: Sacred Food of the Nez Perce, include land development, ownership changes, and environmental factors. Once students understand the significance of the camas plant to many Native peoples of Montana, and that not every tribe harvested camas, the teacher can set up the task.

Students should imagine they are helping a family collect camas bulbs for a celebration. In this scenario, the student collects 15 bulbs in total and stores the bulbs in small pouches, with each pouch holding 10 bulbs. The teacher should ask: “If you fill the first pouch, how many would you place inside the second to carry them home?" Students may use manipulatives (e.g., counters or small items) to group 10 bulbs into one "pouch" and place the remaining 5 separately. Students may represent this visually by drawing one group of 10 and 5 individual bulbs, or by using ten frames. They may represent this by writing the equation: 15 = 10 + 5. This activity can be repeated with different values to further demonstrate how numbers can be decomposed (e.g., 12, 13, 14, …).

To extend the cultural and personal relevance, the teacher may ask questions such as: “Have the adults in your life ever talked about how the land, plants, or town in our community have changed over time?”, “What special foods does your family prepare for celebrations?”, “When things in our community or experiences change—like the land or the way we do things—what are some good things that happen? What are some things we might miss or lose?”, or “A long time ago, people picked camas bulbs in big open fields. Today, some of those fields have roads or buildings. What might be good about that? What might be sad about that?”

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources: EU 1, EU 2, EU 3, EU 5 and EU 6

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources: Additive or Transformation– Describing the specific experiences of Indigenous individuals, drawing connections between traditions, ceremonies, or stories associated with multiple Tribes, or including tribally specific resources would achieve the level of “additive”. Alternatively, engaging resources and reflection questions that allow students to consider the perspectives of specific Tribes or Indigenous individuals, and draw connections to contemporary experiences activates a level of depth and engagement for learners that rises to the “transformation” level.

## Relevant Resources:

- Camas: Sacred Food of the Nez Perce (Nimiipuu) – Lolo Pass Visitor Center
- Puyallup Tribe hosts c'abid (camas) harvest at PLU – YouTube
- Camas Cookbook – Murphy, M. (2016) Washington State Dept. of Agriculture.

**Important note:** There is a plant with a similar-looking bulb, called Death Camas. If you are showing the edible camas plant to students, be sure to remind students not to eat plants that are unfamiliar to them or without asking an adult.

## Proficiency Rubric Example:

1. **Beginning**: The student is **not yet able to** compose and decompose numbers from 11-19 into ten ones and further ones in multiple ways or record each composition or decomposition by a drawing or an equation without **intensive support**.
2. **Developing**: The student **can** compose and decompose numbers from 11-19 into ten ones and further ones in multiple ways **or** record each composition or decomposition by a drawing or an equation, **or** the student can engage both skills **with some support.**
3. **Proficient**: The student **can** compose and decompose numbers from 11-19 into ten ones and further ones in multiple ways **and** record each composition or decomposition by a drawing or an equation **with independence and accuracy**.
4. **Mastery**: The student **can** compose and decompose numbers from 11-19 into ten ones and further ones in multiple ways **and** record each composition or decomposition by a drawing or an equation **with independence and accuracy**. The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations.

# MT.K.MD.1:

**Describe several attributes of a single object.**

## General Notes:

This centers on students identifying and describing multiple attributes of a single object, such as its size, shape, color, texture, weight, etc. By exploring and discussing attributes, students develop vocabulary and observational skills that are foundational for measurement and classification tasks in later grades. Instruction should encourage hands-on exploration with real-world objects, prompting students to compare, contrast, and articulate their observations using precise and developmentally appropriate language.

## Instructional Examples:

- The teacher provides each student with a toy car and asks, “What can you tell me about this car?”. The students may provide responses such as “It’s red,” “It’s smooth,” “It’s small,” “It has four wheels,” etc.
- The teacher provides a pinecone and asks, “What can you tell me about this pinecone?” Students may respond with answers such as “It’s brown,” “It’s spiky,” “It’s rough,” etc.
- The teacher places an object (e.g., a block) in a bag and has students feel it without looking. The teacher asks, “What do you notice about the object just by touching it?” Students may respond with “It’s square,” “It’s smooth,” “It has straight edges,” “It feels heavy,” etc.

## IEFA Integration Example: Traditional Games

### Context and Connection:

Many Tribes, including those in Montana, have traditional games that involve specific tools or objects, such as game sticks, hoops, or balls. These objects have unique attributes that students can explore while connecting to the cultural significance of traditional games. Stick Game, known by many names including Sticks and Bones or Hand Game, is played by Tribal Nations across the country and provides an opportunity for intertribal communities and families to come together to this day. This guessing and strategy game often involves decorated sticks or ‘bones’ that have distinct attributes, providing a contextual example for this standard.

### Task:

The teacher provides an authentic, historical replica, or image of a game stick used in stick or hand games and asks students to describe the attributes. "What can you tell me about this game stick? Look closely at its size, shape, color, and texture." Sample student responses: “It’s long.” “It’s smooth.” “It’s made of wood.” “It has rings on it.” The teacher explains the cultural significance of traditional stick games, including their ongoing role

in fostering community and friendly competition as well as the passing of knowledge from one generation to the next. Students discuss how the attributes of the stick or bone might affect how it is used in the game.

As an extension, the teacher might introduce students to the game using the resources provided, or, ask reflection questions such as “Why do you think people from different Tribes, bands, or families come together to play games like the stick game?”, “How do you feel when you play games with new friends or kids from other places?”, “Has someone in your family or community taught you how to play a game, sing a song, or cook something special?”, “What games do you like to play with your family or friends?”, “How do you feel when you teach someone else how to play a game you know?”, “What do games teach us besides just winning?”, or other questions that capture the values of community, traditions, and shared knowledge.

Having knowledge keepers or community members with familiarity with traditional games could be a powerful integration was well, perhaps giving students an opportunity to play the game on a smaller scale.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources: EU 1, EU 2, EU 3.

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources: Contributions, Additive, or Transformation – Without context specific to a specific Tribe or Tribes, this task would achieve the “contributions” level. With context relating to tribally specific practices, beliefs, traditions, or stories, a slightly deeper depth and engagement might be engaged that would achieve the “additive” level. Connecting this task with a school event where students learn about the specific practices, traditions, and histories of traditional games from Knowledge Keepers, drawing connections to contemporary experiences, activates a level of depth and engagement for learners that rises to the “transformation” level.

## Relevant Resources:

- Alive and Well in Indian Country – Slhal, the Stick Game – Muckleshoot Indian Tribe
- Sticking to Tradition Lesson Plans and Resources – Heather Bleecker and Bray Aldrich
- Bill Smallwood – Crow Hand Games Documentary
- OPI IEFA – Traditional Games Unit

## Proficiency Rubric Example:

1. **Beginning**: Students are **not yet able to** describe several attributes of a single object without **intensive support**.
2. **Developing**: Students **can** describe several attributes of a single object **with some support.**
3. **Proficient**: Students **can** describe several attributes of a single object **with independence and accuracy.**
4. **Mastery**: Students **can** describe several attributes of a single object **with independence and accuracy.** The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations.

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# MT.K.MD.2:

**Directly compare two objects with a measurable attribute in common using comparative language.**

## General Notes:

This standard requires students to demonstrate the ability to directly compare two objects that share a measurable attribute, such as length, weight, or height, and describe the difference using comparative language (e.g., taller, shorter, heavier, lighter). This skill helps students build foundational measurement concepts and develop vocabulary for describing relationships between things they observe. Instruction should provide hands-on experiences where students observe and manipulate real-world objects to make direct comparisons, emphasizing precise language and reasoning.

## Instructional Examples:

- The teacher provides stuffed animals (or images), “Which stuffed animal is longer? Which one is shorter?” The student lays the stuffed animals side by side, observes their lengths, and says, “This one is longer, and this one is shorter.”
- The teacher shows images of two hay bales, one large round bale and one smaller square bale, and asks, “Which hay bale is heavier? Which one is lighter?” Students use comparative language based on visual clues or provided weights, stating, “The round bale is heavier, and the square bale is lighter.”
- The teacher provides two containers and asks, “Which container can hold more water? Which one can hold less?” The student pours water into each container and concludes, “This container can hold more, and this one can hold less.”

## IEFA Integration Example: Traditional Games

### Context and Connection:

"Rock in the Fist" is a traditional youth game played by the Niitsitapi/Pikuni (Blackfeet) with variations appearing in many other Montana tribes, as an introduction to more advanced games like Stick Game or Hand Game. This hiding game involves a small rock and a stick, offering opportunities for students to compare their measurable attributes.

### Task:

The teacher introduces the activity: “In the traditional game ‘Rock in the Fist,’ players use a small rock and sometimes a stick as part of the game. Let’s compare the rock and the stick. Which one is longer? Which one is shorter?” The teacher provides a small rock and a stick (or replicas) for students to compare side by side. Students use comparative language, such as, “The stick is longer, and the rock is shorter.” The teacher explains the cultural significance of "Rock in the Fist" as a traditional youth game that builds observation, strategy, and social interaction such as the values applied to winning and losing. Students can discuss how the attributes of the rock and stick might influence their role in the game. Students could compare

additional attributes, such as weight, texture, or size, using descriptive language. For example, “The rock is heavier, and the stick is lighter,” or “The rock is smooth, and the stick is rough.”

The teacher may extend the activity by teaching the students the game and letting them play, showing the video resources provided below, or inviting cultural knowledge keepers into the classroom. They might discuss how understanding the attributes of the objects helped them during the game.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources: EU 1, EU 2, EU 3

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources: Additive or Transformation– Describing the specific experiences of Indigenous individuals, drawing connections between traditions, constructions, game rule, etc., associated with multiple Tribes, or including tribally specific resources would achieve the level of “additive”. Alternatively, engaging resources and reflection questions that allow students to consider the perspectives of specific Tribes or Indigenous individuals, and draw connections to contemporary experiences activates a level of depth and engagement for learners that rises to the “transformation” level.

## Relevant Resources:

- Traditional Games Unit – OPI IEFA
- First Peoples Buffalo Jump: Traditional Native American Games – MT State Parks

## Proficiency Rubric Example:

1. **Beginning**: The student is **not yet able to** directly compare two objects with a measurable attribute in common using comparative language without **intensive support**.
2. **Developing**: The student **can** directly compare two objects with a measurable attribute in common using comparative language **with some support**.
3. **Proficient**: The student **can** directly compare two objects with a measurable attribute in common using comparative language **with independence and accuracy**.
4. **Mastery**: The student **can** directly compare two objects with a measurable attribute in common using comparative language **with independence and accuracy**. The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations.

# MT.K.MD.3:

**Classify, count, and sort objects into categories. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities.**

## General Notes:

This standard focuses on students' ability to organize objects into categories based on shared attributes and then count the total number of objects in each category. Sorting helps develop foundational skills in classification, counting, and comparison. These are foundational understandings for data analysis and problem-solving in later grades. Incorporating cultural contexts, such as traditional Montana Indigenous practices and local community activities, can make this standard more meaningful and engaging to students. Instruction should emphasize hands-on activities where students develop vocabulary for describing categories and attributes in context.

## Instructional Examples:

- The teacher brings in or shows pictures of objects found in Montana's natural environment, such as pinecones, rocks, and leaves. Students classify the objects based on attributes, such as shape or color. For example, "brown pinecones," "smooth rocks," and "green leaves." Students count the number in each category and determine which has the most or least.
- The teacher provides a collection of buttons with different attributes, such as size, color, and number of holes. The teacher asks, "Can you sort these buttons into groups? You can decide how to sort them." Students observe the buttons and decide how to categorize them. Students may determine differing methods of sorting and yield differing answers when counting the total in each category. This activity should be accompanied by discussions involving reasoning and observations.
- The teacher provides relevant context such as a community member preparing to create a star quilt for their grandson's basketball championship game (IEFA) or sewing a quilt to enter a county fair competition (local). The teacher provides multiple quilt swatches (e.g., squares, rectangles, different colors, patterns, sizes, etc.) and asks students to help sort them for the quilter. Students should determine how they would like to classify the items (e.g., by shape, color, or size), sort them into appropriate groups, and count the total number in each group.

## IEFA Integration Example: Quillwork

### Context and Connection:

Artistic practices like quillwork, ledger art, or painting often involve materials and patterns that can be classified and sorted. This example focuses on quillwork, an intricate form of art traditionally used among Plains Tribes such as the Lakota (Sioux), Tsêhésenêstsestôtse/So'taa'eo'o (Northern Cheyenne), and Nakoda/Nakona (Assiniboine) to decorate clothing, horse bridles, bags, and other items. Although some designs are shared within a

Tribe, the expression is often unique to the individual artist. Quillwork is especially important because it is fully traditional artform that does not require any colonial materials. Like many Native artforms however, quillwork has been shaped by colonialism, federal restrictions and modern practices. The stories, meanings, and techniques of this artistic medium vary by Tribe and are often passed down from one artist to another.

## Task:

The teacher might begin by showing images of quillwork, sharing the Tsêhésenêstsestôtse/So'taa'eo'o (Northern Cheyenne) story of Quillwork Girl and Her Seven Brothers, or inviting a local artist to share their practice with students. Students might be allowed to touch quills if appropriate for the age group and behavior regulation abilities of the class, but real quills are not recommended for use in this activity due to their sharp nature.

Once students understand that quillwork has unique traditions, stories, and designs to each Tribe and artist and have been able to look at Tribally specific examples, the teacher might introduce the following scenario:

"You are helping an artist prepare materials for a quillwork project. The artist has dyed porcupine quills in different colors and sizes. Can you help sort the quills to make it easier for them to start their design?" The teacher provides objects or images representing porcupine quills in various colors and lengths (e.g., popsicle sticks, dowels, colored straws, etc.). Students sort the quills into categories:

- **Example 1:** Sorting by color (e.g., red, blue, yellow).
- **Example 2:** Sorting by size (e.g., short vs. long). Students should count the total number of “quills” in each category. The teacher explains the cultural significance of quillwork and its role in traditional art, clothing, and storytelling. Students learn how sorting and organizing materials is a critical step in creating detailed and meaningful art.

As a potential extension, students could design their own patterns using colored paper strips to represent quills or paste straws on paper. They may group and count the “quills” they use in each section of their design. They may also have an opportunity to reflect on their designs perhaps through questions such as “How does it feel to create art?”, “We all used the same materials, but our designs all look different. How is your art unique from your friends’?”, etc.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources: EU 1, EU 2, EU 3, EU 6.

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources: Additive or Transformation– Describing the specific experiences of Indigenous individuals, drawing connections between traditions associated with

multiple Tribes, or including tribally specific resources and stories would achieve the level of “additive”. Alternatively, engaging resources and reflection questions that allow students to consider the perspectives of specific Tribes or Indigenous individuals, and draw connections to contemporary experiences activates a level of depth and engagement for learners that rises to the “transformation” level.

## Relevant Resources:

- Smithsonian National Museum of the American Indian – Women’s Arts
- Montana PBS – Dakota Quill Work: Embracing Culture and Tradition Through Empathy
- Smithsonian – Star Stories: Quillwork Girl and Her New Seven Brothers

## Proficiency Rubric Example:

1. **Beginning**: The student is **not yet able to** classify, count, and sort objects into categories without **intensive support**.
2. **Developing**: The student **can** count, classify, **or** sort objects into categories **or** is able to employ all three skills **with some support**.
3. **Proficient**: The student **can** count, classify, **and** sort objects into categories **with independence and accuracy**.
4. **Mastery**: The student **can** count, classify, and sort objects into categories **with independence and accuracy**. The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations

# MT.K.MD.4:

**Describe attributes and identify the names of coins.**

## General Notes:

This standard introduces students to basic financial literacy by requiring them to recognize and name coins (e.g., penny, nickel, dime, quarter) and then describe their physical attributes, such as size, color, value, and features. Students develop observation skills by identifying distinguishing characteristics like the coin's color, size, or images. Instruction should incorporate real or replica coins, providing hands-on opportunities for students to explore and discuss their features. This foundational understanding prepares students for future concepts of money value and financial transactions. Note that recognizing, reading, or writing the word is not part of this standard and should not be used to assess the standard, but can be used as a methodology for students to identify the name of the coin if verbal articulation is not accessible.

## Instructional Examples:

- The teacher shares a story: “You are at a store, and you are looking for a coin to buy something that costs five cents. Which coin do you need?” The student responds: “The nickel!” When asked how they knew, students should provide reasoning based on the attributes they noticed.
- The teacher holds up a coin and asks students to identify its name and describe its features. “What coin is this?” the student replies: “This is a quarter. It is silver, larger than a nickel, and has an eagle on the back.”
- The teacher presents a penny, nickel, dime, and quarter and asks the students to describe the coins. Students may informally compare, saying things like “The dime, nickel, and quarter are all silver” though drawing these comparisons is not required in assessment of this standard. Students may use descriptors such as “round,” “brown,” “silver,” “bumpy sided,” etc., or may describe the images printed on the coins. They should be encouraged to use the coin name in these descriptions. The teacher might support by providing sentence stems such as “The _____ is _____.”

## IEFA Integration Example: Tribal Commemorative Coins

### Context and Connection:

Many Indigenous Tribes, including Tribal Nations in Montana, are highlighted on commemorative coins issued by the U.S. Mint or created by tribal communities. Some examples specific to Montana include the Native American $1 coin program, the Montana State Quarter, and the America the Beautiful Quarters. These coins often feature culturally significant symbols, images, or events, providing a meaningful context for identifying and describing coins.

## Task:

The teacher might set up the task by saying "Let's look at some special coins that honor Indigenous people, cultures, and history. These coins are part of commemorative collections. Can you describe what you see on these coins and how they are different from regular coins like quarters or nickels you've seen before?" The teacher provides images or replicas of tribal commemorative coins alongside regular U.S. coins. Students observe the coins, describe, and compare their features (e.g., "This coin has a picture of a bison, and it's silver" (Buffalo Nickel), "This looks like a quarter, but has a ballerina on it" (Maria Tallchief Women's Quarter), etc.). The teacher explains the cultural significance of the images on the commemorative coins, such as the bison's importance to Montana tribes or the role of Indigenous people in shaping U.S. history. Students learn how coins can tell stories and honor traditions. Students could design their own "commemorative coin" featuring symbols or images representing their family, community, or something they value. They would describe the attributes of their design.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources: EU 1, EU 2, EU 3, EU 4, EU 5.

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources: Contributions or Additive – Without context specific to a specific Tribe or Tribes, this task would achieve the "contributions" level. With context relating to tribally specific practices, beliefs, traditions, or stories, a slightly deeper depth and engagement might be engaged that would achieve the "additive" level

## Relevant Resources:

- United States Mint – Native American Coins
- South Dakota Public Radio – Native American Images on Money

## Proficiency Rubric Example:

1. **Beginning**: The student is **not yet able to** describe attributes and identify the names of coins without **intensive support**.
2. **Developing**: The student **can** describe attributes **or** identify the names of coins, **or,** the student can engage both skills **with some support.**
3. **Proficient**: The student **can** describe attributes **and** identify the names of coins **with independence and accuracy**.
4. **Mastery**: The student **can** describe attributes **and** identify the names of coins **with independence and accuracy**. The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations.

# MT.K.MD.5:

**Explain time in days, months, years, and seasons.**

## General Notes:

This standard focuses on building students' understanding of time as a sequence and cyclical concept. Students learn to identify and describe units of time (days, months, years) and recognize patterns associated with seasons. Instruction may connect time to students' daily lives and the natural world, helping them understand how events and activities align with specific times. Visual aids like calendars, timelines, and seasonal illustrations, along with hands-on activities, can also support learning.

## Instructional Examples:

- The teacher displays a visual daily schedule and asks students to describe what happens on specific days of the week. (e.g., "What do we do on Mondays?")
- The teacher uses a classroom calendar to discuss months and days. (e.g., "What month is it right now? What events happened this month? How many days are in this week?")
- The teacher shows pictures of the four seasons and asks students to describe what happens during each season. (e.g., "What season do people go snow sledding in? What seasons do the ranchers in our community calve? What season do the Salish tell stories about Coyote? What do you like to do in the summer with your family?")
- The teacher asks students to share their birthday month and discuss how birthdays happen once a year. (e.g., "Who has a birthday in March?")

## IEFA Integration Example: Seasonal Rounds (Great Circle)

### Context and Connection:

Many Tribes have specific seasonal rounds that reflect their connection to the natural world, guiding their activities throughout the year. Traditionally, tribes followed seasonal cycles for hunting, fishing, gathering, storytelling, and ceremonies, which aligned their practices with the natural availability of resources and the changing seasons. This activity helps students understand how the concepts of time, seasons, and activities are intertwined with the cultural knowledge and practices of Indigenous Peoples. Examples of the seasonal rounds from the Nimíipuu (Nez Perce), Newe/Neme (Shoshone Bannock), and Sélíš (Salish) tribes are available in the resources provided here. To increase the local relevance, educators may consider incorporating the specific seasonal rounds of Tribes relevant to the school community or location.

## Task:

The teacher should introduce the lesson by providing the context: "Many tribes planned their activities around the seasons. They followed natural cycles, like when certain plants grew or when animals migrated. Let's explore how each season guided their activities." The teacher provides visuals or artifacts (e.g., pictures of plants, animals, and seasonal activities specific to these tribes) and asks students to match them to the appropriate season within a tribally specific seasonal round. Students may notice that some tribes engaged in similar practices during different months or seasons. The teacher should explain how the seasonal rounds of each Tribe reflect their deep understanding of the natural world. Students will learn how these activities supported survival, cultural traditions, and community bonds. The teacher can also discuss how these practices continue today, connecting past and present.

This activity could be expanded to compare traditional methods of tracking seasons with modern methods, how these seasonal rounds may have been affected by climate change, and connectivity with personal experiences. Teachers can ask the following reflection questions to facilitate these discussions: "How do you think people knew what to do in each season before calendars existed?", "What signs in nature tell us that a new season is starting?", "What do you think happens when a season doesn't feel like it usually does?", "Why might it be harder for people to plan their activities today if the seasons change in new ways?", "What do you and your family like to do in the summer? What about in winter?", "Do you have special traditions, foods, or celebrations that happen in certain seasons?", etc. Students could create their own "seasonal round", showing when they engage in certain activities with their families and communities.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources: EU 1, EU 2, EU 3, EU 6.

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources: Contributions, Additive, or Transformation – Without context specific to a specific Tribe or Tribes, this task would achieve the "contributions" level. With context relating to tribally specific practices, beliefs, traditions, or stories, a slightly deeper depth and engagement might be engaged that would achieve the "additive" level. Connecting this task with a school event where students learn about the specific practices, traditions, stories, and histories of seasonal rounds from Knowledge Keepers, drawing connections to contemporary experiences, activates a level of depth and engagement for learners that rises to the "transformation" level.

## Relevant Resources:

- Model Lesson Unit: FUN-ology! Seasons Make the World Go Round Science Lesson (3-5th grade)
- Model Lesson Unit: There is a Season (2nd grade)
- Nez Perce Wallowa (OR) Homeland – Seasons and Cycles
- Salish Kootenai College - Journey to the Lake and We Share Our Gifts Stories
- Indian Reading Series – Story of the Seasons

## Proficiency Rubric Example:

1. **Beginning**: The student is **not yet able to** explain time in days, months, years, and seasons without **intensive support**.
2. **Developing**: The student **can** explain time in days, months, years, **or** seasons, **or** can explain time in all four metrics **with some support**.
3. **Proficient**: The student **can** explain time in days, months, years, **and** seasons **with independence and accuracy**.
4. **Mastery**: The student **can** explain time in days, months, years, **and** seasons **with independence and accuracy**. The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations.

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# MT.K.G.1:

**Describe the relative positions of objects in their environment. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities.**

## General Notes:

This standard focuses on developing spatial awareness by teaching students to describe the relative positions of objects using terms such as "above," "below," "next to," "in front of," "behind," "beside", etc. Students should use developmentally appropriate precise language, like naming the shapes or objects they are referring to as well as the position (e.g., “The square is above the circle”). Instruction may involve hands-on activities where students explore and describe the positions of objects in familiar environments, such as the classroom or outdoors. Incorporating cultural contexts, such as those related to Montana Indigenous Peoples and local communities enhances the relevance and meaning of this standard for students.

## Instructional Examples:

- The teacher provides a simple map of a local town and asks students to describe the positions of landmarks. (e.g., Teacher: “Where is the school compared to the park?” Student: “The school is next to the park.”)
- During a nature walk, the teacher asks students to describe the relative positions of natural objects. (e.g., Teacher: “Where is the rock compared to the tree?” Student: “The rock is behind the Tree.”)
- During recess or outdoor time, the teacher asks students to describe the positions of playground equipment or classmates.
- The teacher provides a map of the eight reservations in Montana and asks students to describe their position on the map in relation to others. For example, a teacher might ask “We live near the Fort Peck Reservation, where is the Rocky Boy Reservation in comparison?” Students might respond with answers such as “To the left” or “Fort Peck is close to the corner, but Rocky Boy is more in the middle.”

## IEFA Integration Example: Jingle Dancer by Cynthia Leitich Smith

### Context and Connection:

Using the book *Jingle Dancer* by Cynthia Leitich Smith, students can explore spatial relationships through the story of Jenna, a young Muscogee (Creek) girl, as she gathers jingles for her dress to dance at a powwow. The Jingle Dress Dance originated over 100 years ago by an Ojibwe medicine man when his granddaughter fell sick, possibly during the 1918 flu pandemic. The National Council of American Indians shares that four women spirit guides taught the man how to make the dress, which songs to play, and how to dance, telling him that performing the dance with his granddaughter would heal her. The man’s granddaughter was healed as she danced the Jingle Dress Dance. Since then, the dance has become popular at powwows across the country, including in Montana. In a reflection of this history, during the 2020 COVID-19 pandemic, an 11-year-old from Arlee, MT. named Aurora O’Neil danced the Jingle Dress Dance at sundown for multiple days to ask the creator for healing upon the earth. This activity engages the

story Jingle Dancer by Cynthia Leitich Smith and asks students to apply their understanding of position to describe the placement of objects and characters in the text.

## Task:

The teacher reads *Jingle Dancer* to the class, pausing at key points in the story to discuss spatial relationships depicted in the illustrations or text. "In the story, Jenna gathers jingles from family and friends for her dress. Let's describe the positions of the people and items Jenna interacts with during her journey." The teacher shows illustrations from the book and asks students to describe the relative positions of objects and characters (e.g., "Where is Jenna standing compared to her grandma in this picture?" In this picture, Jenna and her Great-Aunt Sis are hugging, what do you see behind them?", etc.) The teacher discusses the importance of the jingle dress dance in Jenna's culture and how her interactions with family and community reflect shared values like generosity and respect.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources: EU 1, EU 2, EU 3, EU 5, EU 6.

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources: Additive - With context relating to tribally specific practices, beliefs, traditions, or stories, a slightly deeper depth and engagement might be engaged that would achieve the "additive" level.

## Relevant Resources:

- National Council of American Indians – The History of the Jingle Dress Dance
- KTVQ News – Montana Girl Jingle Dances for Healing During Pandemic – YouTube
- OPI IEFA Model Teaching Unit

## Proficiency Rubric Example:

1. **Beginning**: The student is **not yet able to** describe the relative positions of objects in their environment without **intensive support**.
2. **Developing**: The student **can** describe the relative positions of objects in their environment **with some support**.
3. **Proficient**: The student **can** describe the relative positions of objects in their environment **with independence and accuracy.**
4. **Mastery**: The student **can** describe the relative positions of objects in their environment **with independence and accuracy**. The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations.

# MT.K.G.2:

**Correctly name shapes regardless of their orientations or overall size.**

## General Notes:

This standard focuses on helping students recognize and correctly name basic two-dimensional and three-dimensional shapes, such as circles, squares, triangles, rectangles, cones, and cubes, regardless of their orientation (e.g., rotated or flipped) or size. Students learn that a shape's name and defining attributes remain consistent. Recognizing shapes presented in diverse ways, environments, and contexts builds a foundation for future geometric reasoning and problem-solving.

## Instructional Examples:

- The teacher shows students cards or cutouts of basic shapes (e.g., circles, squares, triangles) in different sizes and orientations and asks students to identify the shape. The teacher may have students compare shapes with different orientations or size and ask the student to share how they knew both shapes had the same name.
- The teacher points to objects around the classroom that match a given shape. (e.g., "What shape is the door?", "What shape is the whiteboard eraser?", "Does the size matter when we are naming shapes?") Through this, students should learn that size and orientation do not define what type of shape we are naming, but that other attributes, such as number of sides, are far more important.
- During story time, the teacher pauses to identify shapes in illustrations. (e.g., "What shape is the window in this picture? Does it matter that it's tilted to the side?")

## IEFA Integration Example: The Moccasins by Earl Einarson

### Context and Connection:

In *The Moccasins* by Earl Einarson, the illustrations include various geometric shapes found in everyday items, such as the moccasins, furniture, wallpaper designs, and other household objects. This story provides a context connected to the author's experience for teaching shapes while celebrating Indigenous identity, family connections, and the preservation of items that are special to an individual and their family.

### Task:

The teacher reads *The Moccasins* to the class and pauses to explore the geometric shapes in the illustrations. "In the story, we see many shapes in the objects around the main character, like the moccasins and other items in the house. Let's find and name some of these shapes." The teacher shows specific illustrations from the book and asks students to identify shapes in various orientations and sizes. The teacher discusses how

geometric shapes are found in everyday objects, such as moccasins and household items. Teachers might extend thinking by asking questions like "What items in your home are special to your family?" or "How do stories and special items help us feel connected to who we are?"

This task could also be extended to include the "Shapes in the Blackfeet Language" IEFA lesson plan.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources: EU 2, EU 3, and EU 6.

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources: Additive - With context relating to tribally specific practices, beliefs, traditions, or stories, a slightly deeper depth and engagement might be engaged that would achieve the "additive" level.

## Relevant Resources:

- OPI IEFA Model Teaching Unit
- OPI IEFA – Shapes in the Blackfeet Language

## Proficiency Rubric Example:

1. **Beginning**: The student is **not yet able to** correctly name shapes regardless of their orientations or overall size without **intensive support**.
2. **Developing**: The student **can** correctly name shapes regardless of their orientations or overall size **with some support.**
3. **Proficient**: The student **can** correctly name shapes regardless of their orientations or overall size with **independence and accuracy**.
4. **Mastery**: The student **can** correctly name shapes regardless of their orientations or overall size with **independence and accuracy**. The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations.

# MT.K.G.3:

**Identify shapes as two-dimensional or three-dimensional.**

## General Notes:

This standard focuses on helping students differentiate between two-dimensional shapes, like circles, squares, and triangles, and three-dimensional shapes, like spheres, cubes, and cylinders. Students learn that 2D shapes are flat and can be drawn on a piece of paper, while 3D shapes have depth and can be interacted with or physically held. Instruction often includes hands-on exploration, encouraging students to compare their attributes, such as flat vs. solid, edges, corners, and faces. Contextual examples help make the concept concrete and relatable.

## Instructional Examples:

- The teacher provides a mix of 2D shapes (e.g., cutouts of circles, squares, triangles) and 3D objects (e.g., spheres, cubes, cones) and asks students to sort them into two groups: "two-dimensional shapes" and "three-dimensional shapes."
- The teacher asks students to find 2D and 3D shapes in the classroom. (e.g., “Can you find something that is flat like a rectangle? What about something that has depth like a cylinder?”)
- The teacher shows a picture of a basketball and a drawing of a circle and asks students to describe which is 2D and which is 3D.

## IEFA Integration Example: Shields

### Context and Connection:

Shields have been long used among many Montana tribes for practical, ceremonial, and symbolic purposes. These shields often incorporate geometric designs unique to the Tribe or individual. This task engages the context of a historical site in Montana – Bear Gulch and Atherton Canyon, located approximately 30 miles from Livingston, where petroglyphs and pictographs from the Niitsitapi/Pikuni (Blackfeet) and Apsáalooke (Crow) have been preserved for over 1,000 years. In the Apsáalooke (Crow) perspective, shields are scared, powerful objects made by warriors, that have deep spiritual meanings and a special place in oral traditions, like star stories. The Crow were not the only Tribe to use shields, and this lesson could be adapted to local contexts and communities, where appropriate. While shields are physical (having thickness and depth), the pictographs and drawings we see are flat, two-dimensional representations. In this task, students will examine both pictographic examples (2D) and physical or replica shields (3D) and talk about how to tell whether something is 2D or 3D based on what we observe (flat or having volume).

## Task:

The teacher shows students pictographs or drawings of shields and also photographs, videos, or replicas of physical shields (if available through a museum loan, library, virtual gallery, or personal item brought by a cultural knowledge keeper or Elder). If using only images, the teacher should point out that some images are of flat drawings, while physical shields have depth. This may be a challenging delineation for students in kindergarten to grasp, so physical items are preferred.

As a class, or in small groups, students should respond to exploratory prompts such as: “Is this drawing of a shield flat or solid? Why do you say that? Does that make it 2D or 3D”, “Can you see edges, thickness, or volume in the physical shield example?”, “What clues tell you the physical shield is 3D?”, “What shapes do you notice on the shield’s design? Are they 2D shapes or are they drawn to look like solid shapes?”

Students can then receive cards or images showing various shield pictographs, printed shield photos, or model shields (toys or replicas). They should sort these cards into two groups: 2D and 3D. They should explain their reasoning for why they chose to sort the way they did.

This lesson could be extended by sharing that many warriors drew shapes on their shields that had special meaning to them. Students can draw a picture of a symbol they would draw on a shield, if they were honored with permission to create one, and explain what meaning the symbol has to them. Students can also reflect on the task by answering questions such as: “How can we tell if something is 2D or 3D just by looking?”, “Why do you think people drew shields in pictographs instead of re-making them in real life sometimes?”, “which images were hardest to decide 2D or 3D? why?”, “If you could see a warrior’s shield in person, what would you want to ask or learn about it?”.

**Note:** Because of the traditions, significance, and meaning of the shield, it is not advisable to have students create replicas without the involvement of a knowledge keeper or Elder’s permission and guidance.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources: EU 1, EU 2, EU 3

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources: Contributions or Additive – Without context specific to a specific Tribe or Tribes, this task would achieve the “contributions” level. With context relating to tribally specific practices, beliefs, traditions, or stories, a slightly deeper depth and engagement might be engaged that would achieve the “additive” level.

## Relevant Resources:

- Penn Museum – Some Shields of the Plains and Southwest
- University of Montana – A Venture in Native American Shield Making
- Carnegie Museum – Reckonings Exhibit
- OPI IEFA – Bear Gulch and Crow Perspectives on Shields
- OPI IEFA – Bear Gulch and Atherton Canyon Model Lesson

## Proficiency Rubric Example:

1. **Beginning**: The student is **not yet able to** identify shapes that are two-dimensional or three-dimensional without **intensive support**.
2. **Developing**: The student **can** identify shapes are two-dimensional or three-dimensional **with some support**.
3. **Proficient**: The student **can** identify shapes that are two-dimensional or three-dimensional with **independence and accuracy.**
4. **Mastery**: The student **can** identify shapes are two-dimensional or three-dimensional with **independence and accuracy.** The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations.

# MT.K.G.4:

**Analyze and compare two- and three-dimensional shapes using informal language and other attributes.**

## General Notes:

This standard focuses on developing students' ability to analyze and compare two-dimensional and three-dimensional shapes based on attributes like size, shape, number of sides, corners, edges, and faces. Using informal language, students can describe similarities and differences between shapes (e.g., number of sides and vertices/"corners", having sides of equal length, etc.). Comparing shapes encourages students to recognize patterns, commonalities, and to classify objects based on their properties.

## Instructional Examples:

- The teacher provides students with a variety of classroom objects, such as a book, a ball, a box, and a piece of paper. Students sort the objects into 2D and 3D groups and compare them. Asking questions such as "How is the ball different from the piece of paper? How are the box and piece of paper similar?"
- Students use 2D shapes to build patterns on a flat surface and 3D blocks to build structures. Prompt: "What is different about building with flat shapes and with blocks?"
- The teacher asks students to compare everyday items like a pizza slice (2D) and a cone-shaped party hat (3D). Prompt: "How are the pizza slice and the party hat similar? How is it different?"
- The teacher presents a square cutout and a cube and asks students to analyze them and compare them. Students provide answers such as "The cube is 3D and the square is 2D.", "The cube is made of squares.", "The cube is thicker than the square.", etc.

## IEFA Integration Example: Drums

### Context and Connections:

Many Montana tribes, such as the Nakoda/Nakona (Assiniboine), A'aninin (Gros Ventre), Séliš (Salish), Niitsitapi/Pikuni (Blackfeet), Tsêhésenêstsestôtse/So'taa'eo'o (Northern Cheyenne), and Apsáalooke (Crow), create traditional drums for ceremonies, storytelling, and celebrations. These are often used today in community events like graduations, basketball tournaments, or school assemblies. Drums bring people together and help share feelings, stories, and traditions. Sometimes people come together with drums to show they care about something important—like helping someone who is missing, or standing up for a friend, or remembering someone special. These drums incorporate both two-dimensional (2D) and three-dimensional (3D) shapes. The circular face of the drum is a 2D shape, while the assembled drum is a 3D object with depth and volume. Some drums include special patterns and designs which can carry meaning for the artist, family, or the community.

## Task:

The teacher introduces the activity: "Drums are an important part of many Montana tribes' traditions. They are used in ceremonies, dances, and storytelling. Let's look at the shapes we see in a drum. Some shapes are 2D, like the drum's face, while others are 3D, like the drum itself. We will compare these shapes and talk about how they are similar and different." The teacher shows images or replicas of tribally specific traditional drums and provides students with manipulatives, such as paper circles and cylindrical blocks, to explore the shapes involved.

If relevant to the community, the teacher may consider inviting members of a drumming circle, or a hand drummer to join the class and share their experiences creating or playing traditional drums. The teacher should also aim to make statements as specific to tribes as possible, for example, naming the culture a drum originates from in an image to reduce the emergence of pan-indigenous assumptions that may be made by learners.

Example Prompts: What shape is the face of the drum? Is it 2D or 3D?" "What shape is the drum when we look at the whole object? How is it different from the face?" "Can you find other shapes in the drum, like the sides or edges? What do you notice?" The teacher explains how traditional drums are made in Montana, often using wood and hide, and can come in a variety of sizes. The teacher also discusses their importance in ceremonies, celebrations, and storytelling. Students learn about the craftsmanship required to build a drum and the cultural significance of its design through the resources provided below.

The teacher can deepen thinking by guiding students in a discussion, asking questions such as: "Why do you think people use drums when they want to sing for a special reason or come together?", "What does your family do when they come together to celebrate or support one another?", "What are times in your life when you've seen people gather to show care, support, or celebration?" or "Some drums have symbols painted on them. If a drum was designed to tell a part of your story, what symbol might be painted? Why?"

**Note:** Because of the traditions, significance, and meaning of the drum, it is not advisable to have students create replicas without the involvement of a knowledge keeper or Elder's permission and guidance.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources: EU 1, EU 2, EU 3, EU 6

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources:

Contributions, Additive, or Transformation – Without context specific to a specific Tribe or Tribes, this task would achieve the "contributions" level. With context relating to tribally specific practices, beliefs, traditions, or stories, a slightly deeper depth and engagement might be engaged that would

achieve the “additive” level. Connecting this task with a school event where students learn about the specific practices, traditions, and histories of drumming from Knowledge Keepers, drawing connections to contemporary experiences, activates a level of depth and engagement for learners that rises to the “transformation” level.

## Relevant Resources:

- OPI IEFA: American Indian Music: More than Just Flutes and Drums
- Visit Montana – A Day in the Life of a Tribal Drummer - YouTube
- OPI IEFA: Power of the Drum
- Smithsonian National Museum of the American Indian: Yanktonnai Nakota Hand Drum

## Proficiency Rubric Example:

1. **Beginning**: The student is **not yet able to** analyze and compare two- and three-dimensional shapes using informal language and other attributes without **intensive support**.
2. **Developing**: The student **can** analyze **or** compare two- and three-dimensional shapes using informal language and other attributes, **or** the student can employ both skills **with some support.**
3. **Proficient**: The student **can** analyze **and** compare two- and three-dimensional shapes using informal language and other attributes with **independence and accuracy.**
4. **Mastery**: The student **can** analyze **and** compare two- and three-dimensional shapes using informal language and other attributes with **independence and accuracy**. The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations.

# MT.K.G.5:

**Model shapes in the environment. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities.**

## General Notes:

This standard focuses on recognizing geometric shapes in the environment and modeling them using drawings, manipulatives, or physical construction. It emphasizes creating representations based on real-world examples. Students begin to connect abstract concepts to concrete examples, such as observing that a drum is a cylinder with a circular face that can be modeled using materials such as clay. Incorporating cultural contexts, such as shapes from traditional tools or artwork of Montana Indigenous Peoples and local communities, helps students link geometry to their environment, heritage, and lived experiences. This standard asks students to model a single shape at a time, not compositions of multiple shapes, which is expected in MT.K.G.6.

## Instructional Examples:

- The teacher asks students to find shapes in the classroom environment and model them using materials like clay, sticks, or playdough.
- Students explore the playground to find 2D shapes in their environment and replicate them with chalk on the ground.
- During a read-aloud of a story featuring shapes (e.g., *Tangled* by Anne Miranda), the teacher asks students to identify shapes in the story and model them.
- The teacher uses contextual examples, like pumpkins or stop signs, and asks students to model their shapes by drawing, using clay, blocks, etc.
- The teacher presents a picture of a gathering arbor on the Aaniiih Nakoda College campus, outside the Ekib Tsah Ah Tsik/Sitting High Cultural Center. The teacher asks the students what shapes they see. Students should respond with answers such as “a circle with the center cut out”. The teacher might then ask, “What else have you seen with this shape?” (e.g., “doughnuts, innertube, bicycle tire, etc.). The teacher may then ask students to model using modeling clay, by drawing a picture, using string, or other materials.

## IEFA Integration Example: Beaded Bags

### Context and Connection:

There are many varieties of beaded bags or pouches used by specific Tribes across Montana for various purposes. The general traditional beaded pouch was often used as a small purse or bag to carry medicines as well as ceremonial or personal items. While there are many variations in designs and purposes of beaded bags across the Tribal Nations within Montana, this task specifically highlights those from the Ne-i-yah-wahk (Plains Cree), Anishinaabe (Chippewa/Ojibwe) and Anishinaabe/Metis (Little Shell Chippewa). Teachers could expand the local relevancy of this task by exploring

examples of tribally-specific traditional bags crafted by other Indigenous communities, and ensuring that the resources, task context, and applications shared are modified accordingly.

There is no shortage in the variety of designs, sizes, styles, or purposes of bags used by Indigenous peoples across time and landscapes. The Bandolier bag, for instance, created among many Tribes, including Anishinaabe (Ojibwe) artists, were fairly large beaded bags that were often slung over the shoulder and extended down to hip level. These bags were commonly made with traded goods like glass beads, which replaced traditional materials like porcupine quills. Another style of bag that was produced by many Indigenous artists across Tribes, including the Metis, is known as the Octopus or Fire bag. These bags were known for the distinct "legs". The Metis adopted designs from Anishinaabe (Ojibwe) tabbed skin bags as the inspiration for these ornately designed bags, and later, Fire bags became popular among Metis and Cree artists (Barkwell, 2010).

## Task:

The teacher might begin the task by offering a contextual introduction such as sharing images of beaded bags made by Indigenous artists. For example, the teacher may show examples of Bandolier bags or Octopus (Fire) bags, taking time to note the specific Tribe of the artist, and drawing connections to Tribes and bands in Montana. The teacher, or a Knowledge Keeper might describe the types of items carried in these bags and relate this to current practices. The teacher might also take time to ask students what shapes they observe (e.g., the rectangular shape of the bag, specific shapes beaded on the artwork, etc.). It would be helpful to ask this question when viewing an image where the overall shape of the bag is the most prominent or obvious feature, to help students notice the rectangular frame, stating something like: "Look closely at the shape of this bag. How many sides does it have? What do we notice about the lengths of these sides? What shape has these traits?" to guide students to the term "rectangle."

The teacher might then ask students to think about other places they see the rectangle shape in their environment (e.g., doors, window, books, etc.) saying "Those are all great examples of rectangles, just like this traditional beaded bag. Now, we are going to model this rectangle shape you can use materials at your table to make your own rectangle." Students should be presented with multiple items (e.g., popsicle sticks, counters, modeling clay, paper strips, blocks, etc.) that they could use to build a rectangle.

Once students have had time to model this shape, the teacher might recall attention to the bag and ask: "How does your model compare to the shape of the bag? Does it have four sides? Are the opposite sides the same length? Look around the room now, what else in our environment is a rectangle?", pausing to give students time to respond.

This task could be recreated for multiple shapes, including circular or triangular patterns presented on the bags in beadwork, or other cultural contexts.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources: EU 1, EU 2, EU 3, and EU 5.

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources: Contributions or Additive – Without context specific to a specific Tribe or Tribes, this task would achieve the "contributions" level. With context relating to tribally specific practices, beliefs, traditions, or stories, a slightly deeper depth and engagement might be engaged that would achieve the "additive" level.

## Relevant Resources:

- Montana Historical Society – Tradition, Design, Color: Plateau Indian Beaded Bags from the Fred Mitchell Collection
- Virtual Museum of Metis History and Culture - Metis Octopus Bags
- Milwaukee Public Museum Bandolier Bag Collection – Tribes from the Great Lakes and South Dakota regions.

## Proficiency Rubric Example:

1. **Beginning**: The student is **not yet able to** model shapes in the environment without **intensive support**.
2. **Developing**: The student **can** model shapes in the environment **with some support**.
3. **Proficient**: The student **can** model shapes in the environment with **independence and accuracy**.
4. **Mastery**: The student **can** model shapes in the environment with **independence and accuracy**. The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations.

# MT.K.G.6:

**Compose simple shapes to form larger shapes.**

## General Notes:

This standard focuses on students' ability to combine smaller shapes (e.g., triangles, squares, rectangles) to create larger composite shapes. This develops spatial reasoning and helps students understand how shapes fit together to form more complex structures, laying the foundation for future concepts like geometry, fractions, and area. Activities often include hands-on exploration with manipulatives like pattern blocks, tangrams, or cut-out shapes. Students can practice combining shapes to recreate objects or designs they observe in their environment. This standard encourages creativity, problem-solving, and students' understanding of part-to-whole relationships. It also supports later, more challenging concepts in geometry such as those related to area and perimeter.

## Instructional Examples:

- Students use blocks, tissue boxes, cut-out shapes, or other materials to build a train. The teacher might ask "What shapes can you use to make the train's engine? What about the wheels?"
- Students combine shapes to replicate a simple geometric design, such as a star or a quilt pattern. The teacher might ask "Can you use these triangles to make a star? How many triangles do you need?"
- The teacher provides students with tangram, mighty mind puzzles, or magnetic tile pieces and asks them to create familiar shapes (e.g., a bird, fish, showman, etc.) by combining the shapes. Then, the teacher might prompt "What shapes can you use to make a bird? How do the pieces fit together?"
- At Aaniiih Nakoda College, there is a gathering arbor outside the Ekib Tsah Ah Tsik/Sitting High Cultural Center. The teacher presents a picture of this arbor to the students, provides a brief description of its purpose, and asks students to use materials provided to recreate the structure. The teacher might provide tools like blunted toothpicks and mini marshmallows, magnetic tiles, paper, scissors, and tape, or any number of other resources. To support students in the beginning, the teacher might ask what shapes they observe (a circle without its center (annulus) and rectangles) or may follow up the task by asking which shapes the student used to recreate the structure.

## IEFA Integration Example: Star Quilts

### Context and Connection:

Star quilts are a significant art form among many Montana tribes, such as the Nakoda/Nakona (Assiniboine) and Lakota, Dakota (Sioux), and can be used for ceremonial purposes like honoring individuals or celebrating milestones. The intricate patterns on star quilts are made by combining smaller shapes, like diamonds, to form larger geometric designs. In some communities in Montana, Star Quilts are given away at basketball tournaments to

honor players or coaches. Every time a star quilt is made, the maker puts their best work, thoughts, and intentions into every hour, every stitch, and every cut. Creating a star quilt is not about finishing quickly but about putting your heart and mind into the work to honor a person or issue.

## Task:

The teacher introduces the activity by providing context. They may share a brief statement such as: "Star quilts are beautiful and time-intensive artwork where quilters combine shapes like diamonds into large star patterns into a blanket. They are often given as gifts during ceremonies to honor someone special. Today, we are going to learn about these quilts, why they are important, and we will look at some examples of star quilts and create our own designs using small shapes."

The teacher should then show pictures of, or videos about star quilts. They may also read the story Shota and the Star Quilt by Bargaret Bateson-Hill, Christine Fowler, and Philomine Lakota. Once students understand some of the significance of the star quilt, the teacher may provide them with diamond- or triangle-shaped cutouts. Students arrange the cutouts to create larger star patterns. “How can you use the diamonds and triangles to create a star shape? How many diamonds do you need for your pattern?” “What happens if you use more diamonds? Can you make a bigger star?” “How do the small shapes work together to create the big pattern?”

Students could create their own star quilt designs on paper by coloring and arranging pre-drawn diamond shapes. It may be helpful to remind students of Carrie McNab’s interview, and that speed is not the goal – creating a design that comes from the heart is. They could also write or share stories about a time when they were celebrated or honored, share who they would give their star quilt to if they could, or describe a time when they worked really hard to make something for someone else, and how that made them feel, to the activity to personal experiences. Teachers might display students’ work in the classroom or school for others to see.

## Essential Understandings:

The following Essential Understandings have potential to be engaged during the task, dependent upon local application and integration of resources: EU 1, EU 2, EU 3, and EU 6.

## Multicultural Approach:

The following Multicultural Approach(es) are likely to be engaged during the task, dependent upon local application and integration of resources: Additive or Transformation– Describing the specific experiences of Indigenous individuals, drawing connections between traditions associated with multiple Tribes, or including tribally specific resources would achieve the level of “additive”. Alternatively, engaging resources and reflection questions that allow students to consider the perspectives of specific Tribes or Indigenous individuals, and draw connections to contemporary experiences activates a level of depth and engagement for learners that rises to the “transformation” level.

## Relevant Resources:

- Nakoa Heavyrunner - Star Quilt Ceremony – YouTube
- Star Quilt Interview with Carrie McNab
- University of Montana – Star Quilts Oral History Project Collection of Interviews
- University of Calgary – Two Great Lakota Honors: A Star Quilt and an Eagle Feather – YouTube

## Proficiency Rubric Example:

1. **Beginning**: The student is **not yet able to** compose simple shapes to form larger shapes without **intensive support**.
2. **Developing**: The student **can** compose simple shapes to form larger shapes **with some support.**
3. **Proficient**: The student **can** compose simple shapes to form larger shapes with **independence and accuracy.**
4. **Mastery**: The student **can** compose simple shapes to form larger shapes with **independence and accuracy.** The student demonstrates an **advanced** understanding by being able to employ this skill in combination with other standards or by exceeding the developmental expectations.

# Appendix A: Correlation with Common Core State Standards

## An Important Note:

**The Montana State Standards are distinct from the Common Core State Standards (CCSS).** This correspondence information is provided as a reference tool to help educators understand the changes and similarities between the two sets of standards. It is important to note that this does not imply equivalence between the standards; rather, it is intended to support educators in evaluating their curriculum and mapping the Montana Standards to their instructional materials.

Many available curriculum resources are aligned to CCSS, and understanding where overlaps exist can assist educators in identifying areas of alignment or divergence. However, educators should assess each Montana State Standard individually for its specific requirements and application in curriculum and instructional materials. This includes analyzing how well the materials align with the intent and scope of the Montana Standards.

In some cases, teaching solely to the corresponding CCSS may not fully address the Montana Standard, particularly for standards that reference Montana's Indigenous Peoples and local communities. Conversely, certain CCSS may extend beyond the scope of the Montana Standards, necessitating careful consideration to avoid teaching content that exceeds what is developmentally or contextually appropriate for the Montana Standards.

This appendix is designed as a tool to support educators in navigating these distinctions and ensuring that their curriculum and instruction meet the expectations of the Montana State Standards.

# Correspondence of Mathematical Practice Standards with Common Core Standards

| Montana Standard Code | Correlated Common Core Standard(s) |
|---|---|
| MT.MP.1 | CCSS.MP.1 |
| MT.MP.2 | CCSS.MP.2, CCSS.MP.7, CCSS.MP.8 |
| MT.MP.3 | CCSS.MP.3, CCSS.MP.6 |
| MT.MP.4 | CCSS.MP.4 |
| MT.MP.5 | CCSS.MP.5 |
| MT.MP.6 | **No Corresponding Standard** |
| MT.MP.7 | **No Corresponding Standard** |
| | |

# Correspondence of Kindergarten Content Standards with Common Core Standards

| Montana Standard Code | Correlated Common Core Standard(s) |
|---|---|
| MT.K.CC.1 | CCSS.K.CC.A.1 |
| MT.K.CC.2 | CCSS.K.CC.A.2 |
| MT.K.CC.3 | CCSS.K.CC.A.3 |
| MT.K.CC.4 | CCSS.K.CC.B.1 and CCSS.K.CC.B.1.c |
| MT.K.CC.5 | CCSS.K.CC.B.5 |
| MT.K.CC.6 | CCSS.K.CC.C.6 |
| MT.K.CC.7 | CCSS.K.CC.C.7 |
| MT.K.OA.1 | CCSS.K.OA.A.1 |
| MT.K.OA.2 | CCSS.K.OA.A.2 |
| MT.K.OA.3 | CCSS.K.OA.A.3 |
| MT.K.OA.4 | CCSS.K.OA.A.4 |
| MT.K.OA.5 | CCSS.K.OA.A.5 |
| MT.K.OA.6 | **No Corresponding Standard** |
| MT.K.NBT.1 | CCSS.K.NBT.A.1 |
| MT.K.MD.1 | CCSS.K.MD.A.1 |
| MT.K.MD.2 | CCSS.K.MD.A.2 |
| MT.K.MD.3 | CCSS.K.MD.B.3 |
| MT.K.MD.4 | **No Corresponding Standard** |
| MT.K.MD.5 | **No Corresponding Standard** |
| MT.K.G.1 | CCSS.K.G.A.1 |
| MT.K.G.2 | CCSS.K.G.A.2 |
| MT.K.G.3 | CCSS.K.G.A.3 |
| MT.K.G.4 | CCSS.K.G.B.4 |
| MT.K.G.5 | CCSS.K.G.B.5 |
| MT.K.G.6 | CCSS.K.G.B.6 |
| | |

# Appendix B: Addressing Financial Literacy in the Kindergarten Math Standards

## Introduction

There is no single definition of financial literacy, as the concept requires personal connectivity and relevance. However, most agree that financial literacy is the knowledge of how to make smart decisions about your financial resources to achieve financial stability over a lifetime (OPI, 2024).

In 2023, Montana adopted statute 10.55.905, which mandates that students graduate from high school with a ½ credit in economics or personal finance. This requirement allows flexibility, as the course can be integrated into a certain subject area curriculum, including mathematics.

Although this requirement targets graduating seniors, introducing financial literacy concepts at all grade levels can significantly enhance students' awareness and understanding of finances. According to the Federal Deposit Insurance Corporation (FDIC), “teaching kids about money early on will help them become more financially independent as they get older. Financial education has been linked to lower debt levels, higher savings, and higher credit scores as children mature into adulthood” (FDIC, 2020).

Research shows that children are capable of learning about financial literacy at young ages and are significantly impacted by observing the financial behaviors of the adults in their lives, influencing their economic behaviors throughout childhood and adulthood (Center for Financial Security, University of Wisconsin-Madison, 2012). This is supported by the findings of a study conducted by Grinstein-Weiss et al. (2009) which uncovered a significant correlation between parental teaching of money management and higher future credit scores. Furthermore, the financial literacy levels of students are closely linked to personal factors, such as socioeconomic background (Sherraden et al., 2011; Mandell, 2009). Schools therefore present a critical opportunity to help overcome these barriers and improve the financial literacy of all students.

While research on in-school financial education programs generally shows positive outcomes, much of the existing work has been conducted in small-scale studies. There is a growing need for further research to understand the long-term impact of embedding financial literacy concepts into elementary mathematics instruction and how it shapes students' economic behaviors over time.

This appendix aims to provide clarity regarding which Montana Mathematics Content Standards for Kindergarten address financial literacy themes. For further guidance on financial literacy and its integration across other content areas beyond mathematics, please visit the Career and Technical Education page on the Office of Public Instruction website.

## Financial Literacy Themes:

The State of Montana has adopted six themes of Economic and Financial Literacy Instruction based on the National Standards for Personal Finance Education (2021). These themes will be referenced throughout this appendix.

### Summary of Themes of Economic and Financial Literacy Instruction

| Theme | Summary |
|---|---|
| I. Earning Income | Most people earn wage and salary income in return for work, and they can also earn income from interest, dividends, rents, entrepreneurship, business profits, or increases in the value of investments. Employee compensation may also include access to employee benefits such as retirement plans and health insurance. Employers generally pay higher wages and salaries to more educated, skilled, and productive workers. The decision to invest in additional education or training can be made by weighing the benefit of increased income-earning and career potential against the opportunity costs in the form of time, effort, and money. Spendable income is lower than gross income due to taxes assessed on income by federal, state, and local governments. |
| II. Spending | A budget is a plan for allocating a person's spendable income to necessary and desired goods and services. When there is sufficient money in their budget, people may decide to give money to others, save, or invest to achieve future goals. People can often improve their financial well-being by making well-informed spending decisions, which include critical evaluation of price, quality, product information, and method of payment. Individual spending decisions may be influenced by financial constraints, personal preferences, unique needs, peers, and advertising. |
| III. Saving | People who have sufficient income can choose to save some of it for future uses such as emergencies or later purchases. Savings decisions depend on individual preferences and circumstances. Funds needed for transactions, bill-paying, or purchases, are commonly held in federally insured checking or savings accounts at financial institutions because these accounts offer easy access to their money and low risk. Interest rates, fees, and other account features vary by type of account and among financial institutions, with higher rates resulting in greater compound interest earned by savers. |
| IV. Investing | People can choose to invest some of their money in financial assets to achieve long-term financial goals, such as buying a house, funding future education, or securing retirement income. Investors receive a return on their investment in the form of income and/or growth in value of their investment over time. People can more easily achieve their financial goals by investing steadily over many years, reinvesting dividends, and capital gains to compound their returns. Investors have many choices of investments that differ in expected rates of return and risk. Riskier investments tend to earn higher long-run rates of return than lower-risk investments. Investors select investments that are consistent with their risk tolerance, and they diversify across a number of different investment choices to reduce investment risk. |

| | |
|---|---|
| V. Managing Credit | Credit allows people to purchase and enjoy goods and services today while agreeing to pay for them in the future, usually with interest. There are many choices for borrowing money, and lenders charge higher interest and fees for riskier loans or riskier borrowers. Lenders evaluate the creditworthiness of a borrower based on the type of credit, past credit history, and expected ability to repay the loan in the future. Credit reports compile information on a person's credit history, and lenders use credit scores to assess a potential borrower's creditworthiness. A low credit score can result in a lender denying credit to someone they perceive as having a low level of creditworthiness. Common types of credit include credit cards, auto loans, home mortgage loans, and student loans. The cost of post-secondary education can be financed through a combination of grants, scholarships, work-study, savings, and federal or private student loans. |
| VI. Managing Risk | People are exposed to personal risks that can result in lost income, assets, health, life, or identity. They can choose to manage those risks by accepting, reducing, or transferring them to others. When people transfer risk by buying insurance, they pay money now in return for the insurer covering some or all financial losses that may occur in the future. Common types of insurance include health insurance, life insurance, and homeowner's or renter's insurance. The cost of insurance is related to the size of the potential loss, the likelihood that the loss event will happen, and the risk characteristics of the asset or person being insured. Identity theft is a growing concern for consumers and businesses. Stolen personal information can result in financial losses and fraudulent credit charges. The risk of identity theft can be minimized by carefully guarding personal financial information. |
| | |

## Content Standards that Explicitly Address Financial Literacy:

The Kindergarten Mathematics Content Standards contain one standard that specifically addresses financial literacy themes:

**MT.K.MD.4:** Describe attributes and identify the names of coins.

- This standard explicitly addresses financial literacy foundational knowledge.
- There are developmentally appropriate contextual examples within the themes of (I) Earning Income, (II) Spending, and (III) Saving such as: *Provide students with real or pretend coins and have them identify the coins by name and value. Have proficient or highly proficient students use a sorting activity to group coins by type, and then, have students calculate the total value of each group. Discuss how coins can be earned, used to buy goods or saved for future purchases.*

## Content Standards that Could Address Financial Literacy Through Problems in Context:

There are additional Kindergarten Mathematics Content Standards that may address financial literacy themes through specific instruction using problems in context.

These standards have the potential to address financial literacy themes when applied within problems in context. Incorporating context into the instructional delivery of a standard is an effective way to help students meaningfully connect to the content, drawing on their culture and lived experiences.

However, adding context to a standard in a way that exceeds its expectations in assessment can elevate an assessment question to Level 4: Highly Proficient on a proficiency rubric. Educators should be mindful of this distinction when designing assessments to ensure alignment with the intended standard.

The Montana Kindergarten Content Standards that may address financial literacy through problems in context are:

| | | | |
|---|---|---|---|
| MT.K.CC.1 | MT.K.CC.4 | MT.K.NBT.1 | MT.K.MD.4 |
| MT.K.CC.2 | MT.K.CC.5 | MT.K.MD.2 | |
| MT.K.CC.3 | MT.K.CC.6 | MT.K.MD.3 | |

# Appendix C: PK – 1 Vertical Alignment

## Introduction:

Mathematical concepts build progressively as students advance through their PK-12 educational experience. Concepts taught in younger grades quickly become fundamental to a student's success in subsequent grades. Understanding vertical alignment of standards provides valuable perspective into a student's progression of understanding and supports mastery at every grade level.

In 2021, EdReports emphasized that teaching redundant content or failing to address grade-level expectations can lead to significant gaps and imbalances in student learning. The inefficient use of instructional time hinders student progress and leads to student frustration and disengagement (Hicks & Potts, 2021). By understanding how content is scaffolded across grades, educators can make informed decisions about what content to review and when to introduce new concepts (Hicks & Potts, 2021).

This appendix aims to support educators in identifying the fundamental mathematical concepts that build to a student's Kindergarten understanding. It also provides a forward-looking perspective, outlining the progression of skills students will encounter in first grade. Suggested applications of this vertical articulation include:

- **Identifying prior knowledge**: Helping educators pinpoint foundational knowledge students may need to access when introducing new Kindergarten concepts.

- **Supporting differentiation for struggling students:** Assisting educators in identifying and assessing prior-grade standards to address gaps in understanding for students progressing from "emerging" or "developing" to "proficient."

- **Supporting differentiation for highly proficient students:** Enabling educators to identify subsequent grade-level expectations, allowing advanced students to progress beyond the kindergarten standard when appropriate.

- **Facilitating cross-grade-level collaboration:** Encouraging discussions between educators of different grade levels to align curriculum, improve instructional outcomes, and foster consistency in student learning progressions.

## Pre-Kindergarten – Kindergarten – Grade 1 Vertical Alignment Overview:

The following table provides an **overview of an example of a pre-kindergarten to first grade vertical alignment**. Elaborations on these progressions are available as this appendix proceeds. It is worth noting that most mathematical concepts connect to each other and build over time. Therefore, there are multiple ways in which a vertical alignment table like the one provided below, might vary. This document aims to provide some support and guidance to individuals who seek to understand more about how standards connect to others across the PK-1 continuum.

| Pre-Kindergarten | Kindergarten | Grade 1 |
|---|---|---|
| EL.4.10.NSO<br>EL.4.13.AT | MT.K.CC.1, MT.K.CC.3 | MT.1.NBT.1 |
| | MT.K.CC.2 | Foundational Skill |
| | MT.K.CC.4 | MT.1.OA.5 |
| | MT.K.CC.5 | Foundational Skill |
| | MT.K.CC.6, MT.K.CC.7 | MT.1.OA.8, MT.1.NBT.3 |
| | MT.K.OA.1, MT.K.OA.6 | Foundational Skill |
| | MT.K.OA.3, MT.K.NBT.1 | MT.1.OA.3, MT.1.NBT.2 |
| | MT.K.OA.4 | MT.1.OA.4, MT.1.OA.9 |
| | MT.K.OA.5 | MT.1.OA.6, MT.1.OA.7 |
| | MT.K.OA.2 | MT.1.OA.1, MT.1.OA.2, MT.1.NBT.4, MT.1.NBT.5, MT.1.NBT.6 |
| EL.4.11.M<br>EL.4.12.DA | MT.K.MD.1, MT.K.MD.2 | MT.1.MD.1, MT.1.MD.2 |
| | MT.K.MD.3 | MT.1.MD.5 |
| | MT.K.MD.4 | MT.1.MD.4 |
| | MT.K.MD.5 | MT.1.MD.3 |
| EL.4.14.GSP | MT.K.G.1 | Foundational Skill |
| | MT.K.G.2, MT.K.G.3, MT.K.G.4 | MT.1.G.1, MT.1.G.2 |
| | MT.K.G.5 | Foundational Skill |
| | MT.K.G.6 | MT.1.G.3 |
| | | |

While the preceding table is the clearest presentation for many, it is not screen-reader friendly. The OPI is committed to providing reasonable accommodations to people with disabilities. If you need a reasonable accommodation, require an alternate format, or have questions concerning accessibility, please contact the OPI ADA Coordinator at 406-444-3161, opiada@mt.gov, TTY 406-444-0235.

## Pre-Kindergarten – Kindergarten – Grade 1 Vertical Alignment Elaborations:

| Pre-Kindergarten | Kindergarten | Grade 1 |
|---|---|---|
| **EL.4.10.NSO** - Children develop the ability to think and work with numbers to understand their uses, and describe numerical relationships through structured and everyday experiences.<br><br>**EL.4.13.AT** - Children learn to identify, describe, produce, and create patterns using mathematical language and materials. | **MT.K.CC.1** - Flexibly count to 100 by ones and by tens.<br><br>**MT.K.CC.2** - Count beginning from a given number within the known sequence.<br><br>**MT.K.CC.3** - Write numbers from 0-20 and represent a number of objects with a written numeral 0-20. | **MT.1.NBT.1** - Flexibly count, read, write, and represent numbers to 120. |
| | | |

### Elaboration:

- In Pre-Kindergarten, students' ability to identify patterns in numbers, think, work with, and describe numerical relationships sets the foundation for understanding counting conventions and learning that numbers correspond to several objects and that these can be represented by numerals.
- In Kindergarten, students learn to count to 100 by ones and tens (which establishes foundational counting fluency) and to write numbers from 0-20 using numerals.
- Grade 1 extends these skills by introducing counting, reading, and writing numbers up to 120. This supports fluency and prepares students for more complex number representation in advancing grades by introducing larger numbers incrementally to later develop an understanding of place value.

| Pre-Kindergarten | Kindergarten | Grade 1 |
|---|---|---|
| **EL.4.10.NSO** - Children develop the ability to think and work with numbers to understand their uses and describe numerical relationships through structured and everyday experiences.<br><br>**EL.4.13.AT** - Children learn to identify, describe, produce, and create patterns using mathematical language and materials. | **MT.K.CC.4** - Understand the relationship between numbers and quantities and connect counting to cardinality by recognizing that each successive number name refers to a quantity that is one larger within a normal counting sequence. | **MT.1.OA.5** - Relate counting to addition and subtraction. |
| | | |

## Elaboration:

- Pre-kindergarten students begin describing numerical relationships, though they may not yet be developmentally ready to make the leap to cardinality and recognition of the successive nature of numbers. Instead, they may over-rely on memorization which should not be confused with comprehension of cardinality.
- In Kindergarten, students begin to develop an understanding of cardinality. Specifically, that each successive number name represents a quantity that is one larger. Students move from counting objects to representing numbers and operations linearly.
- In Grade 1, counting becomes a strategy for addition (counting on) and subtraction (counting backward). The evolution from counting as a rote skill to a problem-solving tool solidifies students' understanding of number relationships that they will carry with them through their mathematical journey. This progression builds a bridge between counting, operations, and early measurement concepts which will later emphasize number magnitude and spatial reasoning.

| Pre-Kindergarten | Kindergarten | Grade 1 |
|---|---|---|
| **EL.4.10.NSO** - Children develop the ability to think and work with numbers to understand their uses and describe numerical relationships through structured and everyday experiences.<br><br>**EL.4.13.AT** - Children learn to identify, describe, produce, and create patterns using mathematical language and materials. | **MT.K.CC.5** - Count to answer "how many?" in a variety of arrangements and, given a number, produce a set within 20.<br><br>**MT.K.CC.6** - Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group.<br><br>**MT.K.CC.7** - Compare two numbers between 1 and 10 presented as written numerals. | **MT.1.OA.8** - Understand the meaning of the equal sign and determine if equations are true or false.<br><br>**MT.1.NBT.3** - Compare two two-digit numbers using comparison symbols >, =, and <. |

## Elaboration:

- Pre-kindergarten students begin to understand the uses of numbers. This, paired with their ability to think and work with numbers, and to identify and describe patterns supports their ability to notice an arrangement and count “how many.” These skills are also foundational to their ability to produce a set when provided with a number and compare values.
- Kindergarten introduces comparing quantities by determining if one group is greater than, less than, or equal to another group of objects and expands this concept by requiring students to compare written numerals (1–10). This supports transitioning from concrete objects to symbolic representations.
- In Grade 1, students build on these skills by comparing two-digit numbers using the symbols >, =, and <, connecting comparison to place value. MT.1.OA.8 reinforces the meaning of equality and numerical comparison and prepares students to analyze and interpret relationships between numbers, equations, and symbols. This progression begins with concrete comparison of physical objects and eventually transitions to comparing abstract numerals. Students then progress to engaging these skills using symbols and by interpreting equations as true or false.

| Pre-Kindergarten | Kindergarten | Grade 1 |
|---|---|---|
| **EL.4.10.NSO** - Children develop the ability to think and work with numbers to understand their uses and describe numerical relationships through structured and everyday experiences.<br><br>**EL.4.13.AT** - Children learn to identify, describe, produce, and create patterns using mathematical language and materials. | **MT.K.OA.1**- Represent addition and subtraction in multiple ways.<br><br>**MT.K.OA.6** - Recognize the characteristics of the commutative property in addition. | Although no specific Grade 1 standard is identified, this strategy serves as a foundational tool across multiple Grade 1 standards and is crucial for flexibly solving addition and subtraction problems in Grade 1 and beyond. For expanded guidance, refer to the K-5 vertical alignment document. |
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## Elaboration:

- Pre-kindergarten introduces students to identifying patterns and understanding numerical relationships. These two skills specifically support their ability to relate number quantities and understand that applying specific rules to quantities results in predictable outcomes – for example, working with the commutative property or addition and subtraction in kindergarten.
- Kindergarten introduces the concept of representing addition and subtraction in multiple ways, including using objects, drawings, or equations. Students also begin to recognize the commutative property in addition (e.g., 3 + 2 = 2 + 3) as a basic concept for understanding flexibility in addition strategies.
- Although no explicit Grade 1 standards have been identified here, it is not because there are no connections to Grade 1. Teachers should understand that these kindergarten standards serve as foundational concepts to all addition and subtraction problems and higher mathematics. They were separated from other Operations and Algebraic Thinking (OA) problems due to their foundational support to all standards in this domain, not a lack of connectivity. Recognizing the commutative property early in kindergarten develops flexible thinking and sets students up for understanding the structure of addition.

| Pre-Kindergarten | Kindergarten | Grade 1 |
|---|---|---|
| **EL.4.10.NSO** - Children develop the ability to think and work with numbers to understand their uses and describe numerical relationships through structured and everyday experiences.<br><br>**EL.4.13.AT** - Children learn to identify, describe, produce, and create patterns using mathematical language and materials. | **MT.K.OA.3** - Decompose numbers less than or equal to 10 into pairs in multiple ways.<br><br>**MT.K.NBT.1** - Compose and decompose numbers from 11-19 into ten ones and further ones in multiple ways and record each composition or decomposition by a drawing or an equation. | **MT.1.OA.3** - Flexibly compose and decompose numbers to add and subtract.<br><br>**MT.1.NBT.2** - Understand that ten is a unit composed of ten ones and that a two-digit number represents tens and ones. |

## Elaboration:

- Preschoolers' ability to understand the uses of numbers their relationships, as well as their comprehension of math patterns supports their ability to decompose and compose numbers through the understanding of place value predictability.
- Kindergarten introduces students to decomposing numbers up to 10 into pairs which helps them understand part-whole relationships, then expands this understanding to numbers between 11–19 to emphasizing the concept of ten ones and extra ones. This prepares students for concepts like place value and flexible addition and subtraction.
- Grade 1 builds these skills by generalizing decomposition to support addition and subtraction and formalizes the idea of place value by defining two-digit numbers as tens and ones. Understanding how numbers compose and decompose helps students visualize quantities and leads to a stronger grasp of number relationships and mathematical reasoning.

| Pre-Kindergarten | Kindergarten | Grade 1 |
|---|---|---|
| **EL.4.10.NSO** - Children develop the ability to think and work with numbers to understand their uses and describe numerical relationships through structured and everyday experiences.<br><br>**EL.4.13.AT** - Children learn to identify, describe, produce, and create patterns using mathematical language and materials. | **MT.K.OA.4** - For any number from 1 to 9, find the number that makes 10 when added to the given number. | **MT.1.OA.4** - Understand subtraction as an unknown-addend problem.<br><br>**MT.1.OA.9** - Determine the unknown number in an addition or subtraction equation relating to three numbers. |
| | | |

## Elaboration:

- Preschool students' ability to think about and work with numbers and their relationships helps students relate a missing value to the sum of a known value and ten. This relational understanding aids in problem solving.
- In Kindergarten, students are introduced to finding missing addends that sum to 10, which lays the groundwork for understanding unknown values in equations throughout their mathematical education.
- In Grade 1, MT.1.OA.4 expands kindergarten-level understanding by explicitly framing subtraction as an unknown-addend problem (e.g., solving 10 - 3 by thinking of it as "What plus 3 equals 10?") and MT.1.OA.9 generalizes and expands this to determine unknown numbers in both addition and subtraction equations involving three numbers. This continuum encourages flexible thinking and supports students' understanding of subtraction as the inverse of addition. Early work with unknown addends and equations helps students develop strategies for working with missing values, which is an essential understanding for algebra (e.g., $x + 3 = 10$, what is the value of $x$?).

| Pre-Kindergarten | Kindergarten | Grade 1 |
|---|---|---|
| **EL.4.10.NSO** - Children develop the ability to think and work with numbers to understand their uses and describe numerical relationships through structured and everyday experiences.<br><br>**EL.4.13.AT** - Children learn to identify, describe, produce, and create patterns using mathematical language and materials. | **MT.K.OA.5** - Flexibly and accurately add and subtract within 5. | **MT.1.OA.6** - Flexibly, accurately, and efficiently add and subtract within 10.<br><br>**MT.1.OA.7** - Use multiple strategies to add and subtract within 20. (Note: also heavily connected to MT.K.OA.1) |
| | | |

## Elaboration:

- Prekindergarten focuses on relationships and uses of numbers in addition to being able to produce and represent mathematical language. These skills support the ability to see how two numbers may create a sum or difference and how these can be expressed mathematically.
- Kindergarten focuses on exploring basic part-to-whole relationships and practicing simple computation. Flexibility and accuracy imply some level of fluency is engaged, which will be necessary as students move to higher values in later grades.
- In Grade 1, students extend their ability to compute addition and subtraction within 10 and emphasize flexibility, accuracy, and efficiency. They also begin to use multiple strategies to solve problems within 20 and expand their understanding of numbers and operations. These skills serve as building blocks for multi-digit computation in grades 2 and 3. Introducing strategies at each stage enables students to utilize multiple tools for efficient computation and problem-solving in later grades (e.g., approximation, distribution, etc.).

| Pre-Kindergarten | Kindergarten | Grade 1 |
|---|---|---|
| **EL.4.10.NSO** - Children develop the ability to think and work with numbers to understand their uses and describe numerical relationships through structured and everyday experiences.<br><br>**EL.4.13.AT** - Children learn to identify, describe, produce, and create patterns using mathematical language and materials. | **MT.K.OA.2** - Solve addition and subtraction problems in context within 10. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities. | **MT.1.OA.1** - Use addition and subtraction within 20 to solve of all types. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities.<br><br>**MT.1.OA.2** - Solve problems in context that call for addition of three whole numbers with a sum less than or equal to 20 in context of all types. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities.<br><br>**MT.1.NBT.4** - Build a foundation for addition within 100 by: Adding two-digit to one-digit numbers, and adding multiples of 10 to two-digit numbers.<br><br>**MT.1.NBT.5** - Using place value, given a two-digit number, find 10 more or 10 less than the number.<br><br>**MT.1.NBT.6** - Subtract multiples of 10 from a two-digit number. |
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## Elaboration:

- Prekindergarten focuses on relationships and uses of numbers in addition to being able to produce and represent mathematical language. These skills support the ability to see how two numbers may create a sum or difference and how these can be expressed mathematically.
- Kindergarten introduces students to solving addition and subtraction problems involving two numbers, in context, and within 10 to develop foundational problem-solving and reasoning skills.
- Grade 1 extends this understanding of addition and subtraction to 20 in context and introduces the concept of adding three whole numbers. These standards emphasize building a strong foundation for addition and subtraction within 100 by focusing on place value understanding. Understanding how multiples of ten affect a value requires the student to engage skills developed during kindergarten.

| Pre-Kindergarten | Kindergarten | Grade 1 |
|---|---|---|
| **EL.4.11.M** - Children develop skills in using measurement instruments to explore and discover measurement relationships and characteristics, such as length, quantity, volume, distance, weight, area, and time.<br><br>**EL.4.12.DA** - Children apply mathematical skills in data analysis, such as counting, sorting, and comparing objects. | **MT.K.MD.1** - Describe several attributes of a single object.<br><br>**MT.K.MD.2** - Directly compare two objects with a measurable attribute in common using comparative language. | **MT.1.MD.1** - Order three objects by length and compare the lengths of two objects indirectly by using a third object. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities.<br><br>**MT.1.MD.2** - Express the length of an object as a whole number of length units. Understand that the measurement of an object is the number of same-size length units that span it with no gaps or overlaps. |

## Elaboration:

- Pre-K introduces students to exploring many early measurement skills such as discovering “characteristics” or “attributes.” Students begin to explore relationships and make early comparisons between objects. These skills are expanded in kindergarten.
- Kindergarten introduces students to observing and describing attributes of a single object, such as length, weight, or height. Students also begin to compare two objects with a shared measurable attribute using developmentally appropriate language (e.g., longer, heavier, shorter).
- In Grade 1, students build on these skills by comparing and ordering objects by length, using a third object as a reference. They also progress to measuring the length of objects using whole number units, ensuring no gaps or overlaps. This guides students from informal observation of attributes to formal measurement using tools and standard units by Grade 2. Comparing and ordering objects and using tools to measure and estimate are skills that will be necessary as students continue to interact with data and measurement concepts. These concepts present an opportunity to relate these concepts to Montana Indigenous Peoples and local communities to add relevancy and meaning to mathematical learning.

| Pre-Kindergarten | Kindergarten | Grade 1 |
|---|---|---|
| **EL.4.11.M** - Children develop skills in using measurement instruments to explore and discover measurement relationships and characteristics, such as length, quantity, volume, distance, weight, area, and time.<br><br>**EL.4.12.DA** - Children apply mathematical skills in data analysis, such as counting, sorting, and comparing objects. | **MT.K.MD.3** - Classify, count, and sort objects into categories. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities. | **MT.1.MD.5** - Organize, represent, and interpret data with up to three categories by: Asking and answering questions about the total number of data points, identifying how many are in each category, and analyzing differences between categories. |
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## Elaboration:

- In pre-kindergarten, students begin to learn how objects might differ or relate depending on characteristics. They then use these skills to count, sort, and compare these objects. These skills will be expanded in kindergarten.
- In Kindergarten, students begin by classifying, counting, and sorting objects into categories. This provides foundational skills in organizing and understanding data through hands-on exploration and categorization. Students will use contextual examples or objects to relate this skill to lived experiences of Indigenous Peoples and local communities to make math meaningful.
- Grade 1 expands these skills by introducing students to organizing, representing, and interpreting data with up to three categories. Students analyze and compare categories, identifying data points and their differences. This skill requires students to understand how items are counted and sorted. They must then connect these concepts to beginning data analysis to make the concrete abstract to understand and predict contextual situations. This equips students with the ability to gather, organize, and interpret data – all skills that are critical for developing mathematical reasoning, contextual problem-solving, and data literacy.

| Pre-Kindergarten | Kindergarten | Grade 1 |
|---|---|---|
| **EL.4.11.M** - Children develop skills in using measurement instruments to explore and discover measurement relationships and characteristics, such as length, quantity, volume, distance, weight, area, and time.<br><br>**EL.4.12.DA** - Children apply mathematical skills in data analysis, such as counting, sorting, and comparing objects. | **MT.K.MD.4** - Describe attributes and identify the names of coins. | **MT.1.MD.4** - Identify the value of coins. |
| | | |

## Elaboration:

- In pre-kindergarten, students begin to learn how objects might differ or relate depending on characteristics. They then use these skills to count, sort, and compare these objects. These skills will be extended in kindergarten in the context of coins.
- In Kindergarten, students begin by learning to describe the physical attributes (e.g., size, color, and texture) and identifying the names of coins (e.g., penny, nickel, dime, quarter).
- In Grade 1, students build upon this foundation by associating coins with their values. This introduces numerical relationships and prepares students for basic money-related calculations. Understanding the names, attributes, and values of coins is critical to developing financial literacy and comfort with everyday transactions.

| Pre-Kindergarten | Kindergarten | Grade 1 |
|---|---|---|
| **EL.4.11.M** - Children develop skills in using measurement instruments to explore and discover measurement relationships and characteristics, such as length, quantity, volume, distance, weight, area, and time.<br><br>**EL.4.12.DA** - Children apply mathematical skills in data analysis, such as counting, sorting, and comparing objects. | **MT.K.MD.5** - Explain time in days, months, years, and seasons. | **MT.1.MD.3** - Tell and write time in hours and half-hours using analog and digital clocks. |

## Elaboration:

- Measurement and comparison foundational understandings developed in pre-kindergarten set students up to comprehend how time is measured.
- Kindergarten begins with general concepts of time, such as days, months, years, and seasons. This prepares students for more precise time-telling (e.g., reading clocks).
- In Grade 1, students transition to measuring and recording specific points in time (e.g., hours and partial hours) using both analog and digital clocks. The progression from understanding general concepts of time (kindergarten) to specific time-telling (Grade 1) equips students with skills necessary to develop a deeper understanding of how time is measured and used in daily experiences. This supports experiential applications such as reading schedules, planning activities, and interpreting time-related data. The context of time also presents an entry point for students in later grades as they begin to understand concepts related to fractions (e.g., ½ hour = 30 minutes, 1/7 week = 1 day, etc.), to help students understand that fractions are a part of a whole.

| Pre-Kindergarten | Kindergarten | Grade 1 |
|---|---|---|
| **EL.4.14.GSP** - Children build the foundation for recognizing and describing shapes by manipulating, playing with, tracing, and making common shapes. Children learn spatial reasoning and directional words as they become aware of their bodies and personal space within the physical environment. | **MT.K.G.1** - Describe the relative positions of objects in their environment. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities. | Although no specific Grade 1 standard is identified, this strategy serves as a foundational tool across multiple Grade 1 standards and is crucial for developing geometry and problem-solving skills in Grade 1 and beyond. For expanded guidance, refer to the K-5 vertical alignment document. |
| | | |

## Elaboration:

- Pre-kindergarteners' ability to manipulate, play, and trace shapes establishes a baseline for describing the positions of objects in kindergarten.
- Kindergarten continues students' introduction to spatial awareness by describing the relative positions of objects in their environment. This helps students develop an understanding of essential skills for geometry and problem-solving in kindergarten and beyond.
- This standard was not separated for its lack of connectivity to other concepts in kindergarten and first grade, but rather due to its foundational nature. This skill develops spatial reasoning – a critical skill that supports later understanding of geometry, measurement, and data interpretation. Students need to be able to describe and interpret the positions of objects to navigate physical spaces and interpret visual representations, such as maps or diagrams. Incorporating cultural contexts relating to Montana's Indigenous People and local communities enhances students' connections to the content, making mathematics meaningful and relevant.

| Pre-Kindergarten | Kindergarten | Grade 1 |
|---|---|---|
| **EL.4.14.GSP -** Children build the foundation for recognizing and describing shapes by manipulating, playing with, tracing, and making common shapes. Children learn spatial reasoning and directional words as they become aware of their bodies and personal space within the physical environment. | **MT.K.G.2** - Correctly name shapes regardless of their orientations or overall size.<br><br>**MT.K.G.3** - Identify shapes as two-dimensional or three-dimensional.<br><br>**MT.K.G.4** - Analyze and compare two- and three-dimensional shapes using informal language and other attributes. | **MT.1.G.1** - Distinguish between defining attributes and nondefining attributes.<br><br>**MT.1.G.2** - Build and draw shapes to possess defining attributes. |

## Elaboration:

- Pre-kindergarten students' ability to recognize and describe shapes helps with the ability to identify and compare shapes correctly.
- Kindergarten builds a foundation for recognizing attributes of shapes, distinguishing between two- and three-dimensional shapes, applying the ability to compare using developmentally appropriate informal language, and preparing students to describe and differentiate shapes.
- Grade 1 builds on these ideas by teaching students to differentiate between defining attributes (e.g., number of sides) and nondefining attributes (e.g., color, orientation). Students also reinforce this understanding by creating shapes with specific attributes. By learning to classify and differentiate shapes in kindergarten, students become better prepared for the complexity of defining and constructing shapes in later grades.

| Pre-Kindergarten | Kindergarten | Grade 1 |
|---|---|---|
| **EL.4.14.GSP** - Children build the foundation for recognizing and describing shapes by manipulating, playing with, tracing, and making common shapes. Children learn spatial reasoning and directional words as they become aware of their bodies and personal space within the physical environment. | **MT.K.G.5** - Model shapes in the environment. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities. | Although no specific Grade 1 standard is identified, this strategy serves as a foundational tool across multiple Grade 1 standards and is crucial for developing geometry and problem-solving skills in Grade 1 and beyond. For expanded guidance, refer to the K-5 vertical alignment document. |
| | | |

## Elaboration:

- Pre-kindergarten students learn to model shapes in the environment by first becoming aware of their own bodies and personal space. These concepts expand in kindergarten to include additional shapes and objects.
- Kindergarten encourages students to recognize geometric forms in their surroundings and replicate them which fosters spatial awareness and a practical understanding of geometry.
- This standard was not separated for its lack of connectivity to other concepts in kindergarten and first grade, but rather due to its foundational nature. Though there is no explicitly identified standard for first grade, the ability to engage in modeling skills in geometry lays the groundwork for many geometric concepts across first grade. Incorporating cultural and local contexts, such as Montana Indigenous Peoples' traditional art, tools, or structures, enriches the learning experience by connecting mathematical concepts to students' heritage and community. Modeling shapes help bridge understanding between abstract geometric concepts and contextual applications.

| Pre-Kindergarten | Kindergarten | Grade 1 |
|---|---|---|
| **EL.4.14.GSP** - Children build the foundation for recognizing and describing shapes by manipulating, playing with, tracing, and making common shapes. Children learn spatial reasoning and directional words as they become aware of their bodies and personal space within the physical environment. | **MT.K.G.6** - Compose simple shapes to form larger shapes. | **MT.1.G.3** - Compose new shapes using two- and three-dimensional shapes.<br><br>**MT.1.G.4** - Partition circles and rectangles into two and four equal shares. Describe the shares using the words: halves, fourths, and quarters. |

## Elaboration:

- Children's ability to make common shapes in pre-kindergarten is foundational to composing shapes in kindergarten.
- Kindergarten introduces students to composing simple shapes, to form larger shapes which establishes basic spatial reasoning, and an understanding of how smaller parts contribute to a whole. This skill develops their ability to visualize and manipulate geometric forms.
- Grade 1 requires students to compose new shapes using two- and three-dimensional shapes. This enhances their ability to link and reorganize components into more complex structures. These skills are essential for developing spatial reasoning and for preparing students to understand properties, relationships, area, and perimeter of shapes in future grades.

# Appendix D: Statement of Gratitude:

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## K-2 Development Task Force

• Nicole Casper - K-2 Development • Shay Kidd - K-2 Development, Vertical Alignment, Math Practices • Andrea Meiers - K-2 Development • Thomas Redmon - K-2 Development, Mathematical Practices • Carla Swenson - K-2 Development

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