



Math Standards Development Team Development Days



June 19, 2023

Today's Outcomes:

- Launch the math standards development team revision process
- Review and determine critical components from the body of research to guide the standards revision process
- To enhance the development team's understanding of Indian Education for All IEFA to effectively integrate IEFA into the math standards
- Define the Montana Math Learner Profile to guide the development of math standards
- Understand the multi-dimensional facets of math content standards

Task Force Members

Andrea Meiers

Bethany Cooney

Carla Swenson – will email

Cliff Bara

Deanne Gemmill

Elizabeth Burroughs

Eric Stiefuer (REL)

Fred Peck

Jacob Williams (REL)

Janice Novotny

Jennifer Brackey

Jennifer Luebeck

Kris Gardner

Lei-Ann Bertelsen

Marissa Graybill (Helena)

Matt Roscoe

Melissa Shiffer

Nichole Casper

Shay Kidd

Tina Blair

Tom Redmond

OPI Staff

Dr. Julie Murgel, Chief Program Officer

Marie Judisch, Teaching and Learning Senior Manager

Michelle McCarthy, Science Instructional Coordinator

Jennifer Stadium, Indian Education Specialist

Sheri Harlow, Administrative Specialist

Guest presenters:

Elsie Arntzen, Montana Office of Public Instruction State Superintendent

Rob Stutz, Office of Public Instruction Chief Legal Counsel

Mike Jetty, Indian Education Specialist

Jennifer Stadium, Indian Education Specialist

Matt Bell, American Indian Youth Development Coordinator

Crystal Hickman, Indian Education Specialist

Morgan Smith, Indian Education Specialist



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8:30-9:15: Welcome and Warm-Up (45 min)

- Welcome and Kick-off-State Superintendent Arntzen
- Review of standards setting process and role of the Development Team in the process-Rob Stutz, Chief Legal Counsel-OPI
Rob clarified what they expected and that we should have an open concept here, and that it would go onto a few more committees that would review and possibly change, but that we would always have input throughout the process.
- Icebreaker-Group math problem-Region 17
Did exercise to show that the students look at things different, and they can figure it out.
- Agenda review-Marie
- Meeting logistics-Marie

9:15-10:30: Setting the Stage (75 min)

- Review of where we've been – OPI-Marie
 - Process so far (orientation, research presentation, review of other standards)
 - Summation and discussion of research (60)
 - Critical areas addressed in the research
 - What from the research do we need to highlight and keep as focus points throughout the development process?
 - From research - what did you discover that has kept you wondering and thinking about it?
 - What if? Circle activity-Julie

Jigsaw Protocol

Grouped by Grade Band Development Team

Break reading into five equal sections

Review you section individually

Group 1, K-2 Team - [Handout A Foundational Math Content](#)

- Big ideas (4 & foundation's content -e.g. California & British Columbia)
- Wat to keep as focus K-2
- Authentic IEFA inclusion (make as math practice?)
- Fluency
- Reduce time pressure?



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- Take out?
- Vertical alignment (don't let K-2 Big John disappear)
- What do we still wonder?
- Content vs process standards?
- Standards vs Frameworks?
- Make IEFA a math practice?
- How to integrate concepts
- Restructuring?
- Early/pre-kindergarten
- Standards? Observations, sorting, problems, number sense
- How to overcome math anxiety? (make self-efficiency/

Group 2, 3-5 Team - Handout B Mathematical Processes

Group 3, 6-8 Team - Handout C – Pages 2-17 HS Pathways

Big question Algebra 2

Reverse design for CALC

Under emphasis on career readiness

Does making more Math a different math (888) does that result in student math identity?

What is the secret source for students to have a positive experience with math?

MT is 1/3 stats that requires only 2 years of math

It is a call for change! Universal call or reform in math pathways is HS & early college

Group 4, 9-12 Team - Handout C – pages 18-38 HS Pathways

- Process so far (orientation, research presentation, review of other standards)
- !Summation and discussion of research (60)
 - Critical areas addressed in the research
 - What from the research do we need to highlight and keep as focus points throughout the development process?
 - From research - what did you discover that has kept you wondering and thinking about it?
- What if? Circle activity-Julie

10:30-10:45 (Journaling—Break)

10:45-Noon – IEFA Presentation—OPI/culture to concept?

Mike Jetty, Indian Education Specialist - [Dr Hecker Math AIAN Hidden Strengths](#)



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Thank you to all teachers across the state for all you do! Please make sure to check the data resources within the IEFA team. Resources also available in the HUB folder that you may find helpful.

Matt Bell – Indigenous Language Specialist

- History Share resources and [examples](#) – [lodge building](#)
- [EL's suggestions](#)
- [Introduce the relevance of American Indian](#)
- [Student Achievement](#)
- [American Indian Student Achievement Asset based data](#)

Crystal Hickman - [Title American Indian student achievement, relations, & resiliency \(link\) & power point](#)

1:30 pm Lunch

Morgan Smith – Indian Education Specialist
[Indigenous Math Pedagogies](#)

Jennifer Stadium, Indian Education Specialist
[The Six R's of Indigenous Research Tribal College Journal of American Indian Education](#)

Respectful: is it respectful to specific tribal culture?

Jennifer L: Is it appropriate to put the token language in the standards?

Relevance: is it relevant to American Indian students and culture

Relational: are there opportunities to connect student

Reciprocal: are there ways to include both Indigenous knowledge ways and western?

Responsibility: Accountability for the people and knowledge put in our trust.

Representation: Having presence at the table and acting or speaking on behalf of another person or an entire group of Indigenous communities empowers them to identify and share what is relevant and important to their people.

Jennifer invited any teacher to go to a pow-wow, or a reservation talk with the people, learn their ways explore how many books are on the shelves that you can read.

Follow-up question: How has the information from our IEFA and TSARR specialist changed, enhanced, or solidified our thinking around IEFA integration and considerations for our tribal leaders regarding the math standards?

Tina Blair: it seems like a lot of the questions are in the classroom, as opposed to the standards and how does this fit together



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How can we fit this all together, we need teachers in the classroom to understand the standards, then we have all the other stuff to work with? Maybe we can do the standards and then have another portion that states what the other practices are.

There are the things that we need to set as standards, we could put the spiritual standards. It is viable to understand what you are setting up

Making math practices not specifically math standards, but as part of math practices within IEFA. Because there is a different culture thought MT.

Math practices, standards, are not the same thing but they all related if we absorb all of that in these three days that is going to be a huge task that is impossible to undertake.

Collative mathematics on the bulletin board, and how to do this throughout the state. Practice and how do we honor this among IEFA. Western vs tribal?

Educators need to make practices and standards relevant. Not just indigenous students but all students.

Contemplate what the practices are that you want to do, so that it feels authentic. What have we learned from the last time that the standards were written?

Is there a way that we can phrase the standards to comply with all cultures?

Under mathematics can we encompass the "R" into the standards.

Do these need to be individual standards or one fits all? Is it respectful if we put some standard on that does not apply to all cultures/heritages?

2:00-2:15 Discussion: Montana Math Learner Profile

1 to 3:45 pm Group Work [take break as needed] – Region 17

- Goal: Discuss mathematical practices
 - Start with discussions in small groups at tables (re-sort if needed)
 - Have group look at practices and identify potential areas for improvement
 - Reconvene and have small groups present
 - Large-group discussion to agree on areas for improvement

2:30-2:45 Break

We need to keep up what the graphics that are jobs skills that kids will need to have, they keep changing and we need to keep up.

What are essential standards that you are going to need to keep: reasonable, problem solving skills?

What is problem solving skills, reasoning, etc.?



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The need to understand what they are dealing with social emotional, depression, third world is not a social snapshot...everyone has the perfect family, boyfriend, it is a lot to deal with, everything is perfect. How are they seeing themselves?

What would a student say is the most powerful mathematical learning they've experienced?

A statement of skills, knowledge, and dispositions students need to be successful in the world both in and beyond the classroom. . . What are the criteria to keep or toss a standard?

In the last zoo meeting K-8 were happy with their standards

Middle school thinks that there are standards, say in algebra. But once to take it out, and what they leave in. That is also what is going on in HS. Things are changing we keep adding things and not taking anything out, and it is getting overwhelming. I think that we are not realizing that something needs to be taken out.

We can't make choices for students because we don't know their pathway.

We are not looking to take away some standards, we are trying to prioritize the standards to see what is necessary and what are extra for some students are going to be continuing education.

Prioritizing HS Math: what are the foundational courses that they need to take? Maybe a 9-10 grade band. 11-12 is the grade band that is broken up into career goals, so they need more options.

What do students need to be able to know and o in 3rd, 6th, 8th 12th? What attributes to they need to go into the world after graduation?

What essential tools should they be able to use and to what level (excel, bar modeling)

Guiding Principles

1. Keep the learner in the forefront,
 - a. Make standards relevant and valuable to all students

2. Make standards easy to understand
 - a. Organization
 - b. Language
 - c. Provide exemplars for each standard
3. Create standards that can be implemented



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4. Intergrade and make relevant to MT's native culture and state context
5. IEFA is practice throughout/overarching the standards
6. Establish MP1 as essential for the future

What does group need? What do we want to focus on tomorrow?

1. Review clusters
2. Review mathematical practices
3. Discuss structure

Review Mathematical Practices

- Discussion of mathematical practices(review by grade level)
- Mapping of math content standards
 - Review clusters by grade band group and look for shifts and boundaries
 - Merge groups
 - Highlight ones needing clarification or adjusting
 - Identify standards to move to different grades or levels
 - Consider structure/document to capture and align changes
- Homework
 - Look at structures use by different states (Oregon, Idaho, British Columbia; look of documents on HUB) as well as MT.
 - Review the cluster documents

Is the problem really the standards or how they are interpreting them? How can they make the more materials to make it relevant? We need to have a document that is readable, to even its user friendly that will not overwhelm the new teachers.

Example is the Oregon standards, making them short with examples to use

Teaching is modeling, needs a list of content, math practices, we need to put this at the forefront.

Are we now talking about the layout of the document?

It determines what level you are talking about. ELE/MS/HS are all different spaces.

2:45-3:45 The language and multi-dimensions of math standards

3:45 to 4:30 Check-in/Wrap-up/Plan for Tomorrow/Homework

- Rich conversations about what they saw in other places
- Review Superintendent's priorities – Region 17
 - Key priorities:



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- Simplicity
 - Clarity
 - Practicality (pathways at high school level)
- **Big ideas
- Other priorities group wants to discuss?
 - Review domains for opportunity for improvement (e.g. simplicity and clarity)
 - Review practice standards for opportunities for improvement (inclusion of IEFA, simplicity and clarity)
 - Pathways-Do we need to specify domains for minimum competency?
 - What is the purpose of high school standards? Are there irrelevant standards?
 - Do we need to require by course or by domain?
 - Where/how to we include data science and early numeracy

What worked well

Getting professional input – gave a good perspective

Taking notes during breakout times, it was helpful to review

The breakout group was good to talk with everyone and get an idea of that they were thinking and vent frustrating.

Was nice that everyone was responsive, and was ok to make changes to the agenda

Indian education for all – it was nice to see that they were here. Without their input this document might not be complete.

Where is the appropriate place to put these practices for IEFA? Where does it fit.

We are primarily concentrating on Wester not IEFA

Like to work in groups, but it needs to be brought back to main group so that no one gets off track. (making sure that we don't allow too much time between coming back together)

Data Science is in CTE,

Data Science needs to be defined, to see if it belongs in ELE



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Data Science should not be discussed until the standards are set up.

July 20: Review and Writing Continues

8:30-8:45 Welcome Back

Andrea Meiers

Bethany Gooney

Carla Swenson

Cliff Bara

Deanne Gemmill

Elizabeth Burroughs

Eric Stiefuer

Fred Peck

Jacob Williams

Janice Novotny

Jennifer Brackey

Jennifer Luebeck

Kris Gardner

Lei-Ann Bertelsen

Marissa Graybill

Matt Roscoe

Melissa Shiffer

Nichole Casper

Shay Kidd

Tina Blair

Tom Redmond

8:45 to Noon Group Work (Begin standards writing)* (195 min)--OPI and Region 17

- Break into Grade band groups initiate revision of standard
 - Poll participants and see how they want to break up if no preference propose:
 - K-2
 - 3-5
 - 6-8

Cluster statements need to be updated, categories are correct they are misleading, maybe the formatting needs to be revised. Clearly list expectations

- 9-12

Complexity of the MS clusters need to be updated, so they can be ready for HS.

Focusing on domain titles, still the same titles but different pathways.

Financial literacy, current thinking is maybe an ** or a note.

BREAKOUT



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Practice Standards

1. Review current MT practice standards
 - a. Any to add remove or combine
 - b. B potential areas for improvement
 - c. Ideas to include from other states
2. Keep separate or integrate
3. Describe overall or by grade-level

Structure/Inclusion

1. How are we formatting the standards?
2. What's included besides outcome statements?
 - a. e.g. statements of knowledge of skills

OUTCOME:

Collaborate standards?

- #9 include additional communities in MT
- #3 Appreciate vs culture
- #7&8 Collapse/combine?
- Proposal Practice Standard Template
 - move from 8 to 7
 - use most recent MAEP language
 - Keep #1
 - Add IEFA

Practices:

- Call out “representation?”
- Too much detail in examples? Remove examples - Unless you are giving grade band examples
- #8 Abstract and generalizing maybe instead of examples
- Add core competencies
- #6 Add explicit math vocabulary – it is there but maybe making it clearer
- #4 needs to be written – add empathy – modeling different cultures
- Should we add another practice for IEFA and use language from law and use examples for all grade levels.

Is it beneficial to add 7&8 together – merged yes or no

Proposed Practices:



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1. Problem Solving & Perseverance
2. Representing
3. Abstract/Generalizing
4. Justifying
5. Modeling
6. Collaborating Mathematics
7. Indigenous Culture – Montana American Indian

Original Practices:

1. Make sense of problems and persevere in solving them
2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others
4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to Precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

Voting consensus for changing percentage: 70% to pass - proposed passed by 72%

Noon to 1 pm Lunch

Discussion on vote; is this really what we want to do?

Is it aligning to the standards, or how is this going to match?

Is there a relative advantage?

2:30 – 4:00

Subcommittee created to go over the practices and create what it would look like, to see if this is what we wanted.

Report from Subcommittee:

Proposed Practices:

1. Problem Solving & Perseverance
2. Abstract/Generalizing
3. Justifying & Proving
4. Mathematical Modeling
5. Representing
6. Collaborating Mathematics
7. Culture (partly IEAF)



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8. Remaining group will continue spend an hour in your grade-band group
 - 1) Review your standards
 - 2) How to incorporate data science
 - 3) Identify the major areas of focus for your group
 - 4) Create examples of what you'll accomplish and how you will address the superintendent's priorities and structure.
 - a) Be prepared to bring this back to the group
 - 5) Begin work on your areas of focus

Report from Grade-band group

K-8th Grade

Data Science add a ** or symbol where you are using data science in the standards that you are already using.

Suggested layout

- P1 Cluster/big Ideas/domains? (MT/Cal/BS)
- Content (BC)
- P2 Math Practices at that grade (Idaho)
- App-Instructional Practices/additional resources
- HS Pathways – (BC) course
- Similar layout for each course as the K-8 setup

6th- 8th Grade

data Science same thoughts as K-7th
liked the Oregon layout

HS Grade

Liked data science – what are the essential

One pager emphasis document

Liked Oregon – but feel it needs to be organized, need the core – which core standards are in the two math classes? Arrangement needs to be clear and need for 9-10 grades.

What is essential for tomorrow

1. Working on standards language - format
2. Subgroup to graph what it will look like - draft
3. Subgroup to draft what the practices look draft



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July 21: Review and Writing Concludes; Wrap-up and Next Steps

8:00-8:45 Welcome Back

8:45-12:00 Group Work (Vertical Alignment)* - OPI and Region 17

- Form groups by domain
- Groups complete vertical alignment

12:00-1:00 Lunch

1:00-2:00 Group Work (Wrap-up)* - OPI and Region 17

- Continue/complete vertical Alignment
- If complete Groups receive feedback and finalize deliverables

2:00 to 3 pm Finalize Group Deliverable; Wrap-up; Next steps – OPI