FACILITATOR & PARTICIPANT GUIDES

Mathematical Practice #5 Represent

Digging Deeper into the Mathematical Practice (MP) Standards (2026)

This series, developed by the Montana Office of Public Instruction's Math Instructional Coordinator, serves to support educators in understanding the 2026 mathematical practice standards.

In this guide, you will find facilitator and participant materials that accompany the videos created for Mathematical Practice (MP) #5: Represent.

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Attaining and Providing Professional Development Unit (PDU) Certificates

To utilize this video and its materials as a professional learning opportunity, consider the following recommendations and guidelines:

The Administrative Rules of Montana (ARM) define legal parameters for professional development of educators in the following items:

- 10.55.714
- 10.57.215
- 10.57.216

Although informational, the video does not meet the requirements outlined in ARM and therefore does not qualify for Professional Development Unit Certificates. There are, however, many ways in which the video could be utilized strategically by a facilitator in order to elevate it to a professional learning opportunity. Here are some suggestions for how this may work:

FOR ADMINISTRATORS AT PUBLIC SCHOOLS:

- Consider using this video with the adjoining facilitator outline (page 3) as a school-wide professional learning opportunity for your staff. Some appropriate groups include:
  - all elementary educators;
  - mathematics department educators (6-12 appropriate);
  - curriculum coordinator or instructional coaches (PK-12 appropriate); and
  - special-education teachers (PK-12 appropriate);
- At a minimum, this video, paired with 30 minutes of discussion and activity engagement, could be translated to a 1 PDU certificate. However, there are examples where this could be extended into further professional learning. Some examples include:
  - an ongoing participation in each math practice deep-dive by staff members;
  - educators meeting to develop rich learning tasks that emphasize the practice standard; or
  - a follow-up group discussion and check-in where conversations around the challenges and successes in applications of the Math Practice Standard in the classroom setting take place.
- If you are a registered provider of professional development for your school, you can issue professional development unit certificates to educators who have completed the session in compliance with your expectations, district policies, and the Administrative Rules of Montana items provided above. If you are not yet a provider and would like to become one, please visit the "Become a Professional Learning Provider" webpage

Digging Deeper MP#5

Attaining and Providing Professional Development Unit (PDU) Certificates

FOR EDUCATORS WORKING IN PUBLIC SCHOOLS:

- Submit a request to your building administrators to see if they can issue you a professional development unit certificate for completing this work. Consider sharing this facilitator guide with them and review any relevant district policies for submitting such requests.
- With your administrator, consider potential applications for this professional learning. Some suggestions include:
  - An independent professional learning experience where you watch the video, complete the activities, reflect on the prompts, and participate in a conversation with your administrator about the topic, what you learned, some key resources you discovered, and some ways you'd like to experiment with this topic in your classroom instructional practice.
  - A department-wide professional learning experience where you share this video with your department and discuss its content during your regularly scheduled PLC time, following the facilitator outline on page 3.
  - A professional learning event where you practice your teacher-leader skills and host a session for interested individuals in your school or district.

FOR EDUCATORS NOT CURRENTLY WORKING IN PUBLIC SCHOOLS OR THOSE WHO ARE BUT WHOSE REQUESTS HAVE BEEN DENIED BY THEIR ADMINISTRATORS:

- Unfortunately, a pathway does not yet exist for these individuals to receive OPI Professional Development Unit Certificates for watching this video. However, keep an eye out on the Teacher Learning Hub and the Math Standards Webpage for new updates and opportunities.
- Although they may not receive formal units for this, educators can still learn from this video by simply watching and reflecting on the prompts. We hope these educators will still consider engaging in this learning for the intrinsic value it presents.

Published: March 7th, 2025

GENERAL GUIDANCE

PREPARATION BEFORE THE SESSION:

- Verify the approved provider that will issue the certificates to participants (Pages 2 - 3)
- Review the Facilitator Outline (Pages 5-10)
- Confirm access to all required materials:
  - Video links (Pages 5-10)
  - Participant Guide copies (Pages 11 - 19)
  - Writing implements and activity materials (pens, markers, etc.)
  - Digital or physical collaborative workspace tools (sticky notes, whiteboards, etc.)
  - Audio/video equipment
  - Feedback survey (created by the facilitator)
- Test audio/video equipment
- Print copies of the Participant Guide
- Familiarize yourself with district Integrated Strategic Action Plan (ISAP) goals to align discussions.
- Familiarize yourself with the knowledge and expertise of the educators in attendance.
- Take attendance to facilitate issuing Professional Development Unit (PDU) Certificates.

FOLLOWING THE SESSION:

- Issue the feedback survey provided by OPI, referred to in “Closing” (Page 10)
- Issue your own feedback survey to reflect on your strengths and opportunities as a facilitator of professional learning, and to better understand the impact and efficacy of your session.
- Issue PDU certificates to educators and retain attendance records in alignment with ARM (Page 2-3)

MATERIALS NOTE:

Please keep an eye out for these great materials, currently in development:

- Teacher Learning Hub Course
- Additional Math Practice Deep Dive Webinars

Published: March 7th, 2025

OPENING & PART 1:

The following outline is recommended for instances where 'traditional' professional learning is taking place. That is - where a 'instructor' or 'facilitator' is conducting a professional learning event for participants in alignment with the ARM. Please note that this is a recommendation, but facilitators are free to modify the activities as appropriate for the audience. It is estimated that completion of all these activities may take 1-2 hours depending on application.

OPENING (~ 2 minutes)

- Open the session, welcome educators, and provide background information on the mathematical practice standards and their application in instruction.
- Ensure each teacher has access to the 2026 Montana Mathematical Practice Standards.
- Pass out the participant materials located on **pages 11 - 19**
- Check pre-existing knowledge of the audience and make any last minute adjustments to training as appropriate.
- Review the objectives for your session.

PART 1: IDENTIFYING DIFFERENCES (~ 10 minutes)

- Show the first video **Digging Deeper into Mathematical Practice #5: Represent (2026) - PT. 1 Identifying Differences**

- **Pause the video at 2:23** and allow participants the opportunity to respond.
  - Activity Option #1: Think-Pair-Share - Ask participants to record their thoughts on the participant guide, then have them pair with someone nearby, sharing their thoughts. Finally, have participants share to the group what they noticed.
  - Activity Option #2: Analyze - Provide two different highlighters. With one color, ask participants to highlight similarities, with the other color, ask them to highlight distinctions. Use a check-add protocol in partner or table discussions. In this protocol, a person will share what they chose. While this person is sharing, the others will 'check off' commonalities. When it is their turn to share, they will only state the elements that were not mentioned.
  - Activity Option #3: Choose your own engaging and collaborative activity.

- Start the video and play to the end. Have participants record one key takeaway on their participant guide.

PARTS 2 & 3:

PART 2: UNPACKING THE STANDARD (~ 10 minutes)

- Show the second video **Digging Deeper into Mathematical Practice #5: Represent (2026) - PT. 2 Unpacking the Standard.**

- **Pause the video at 1:28** and allow participants the opportunity to respond.
  - Activity Option #1: Provide some reflection time for participants to record their thinking, then ask for volunteers to share skills they see embedded in the standard.
  - Activity Option #2: Provide the standard in written or printed form, ask educators to bold the verbs and underline the nouns. Have participants then record the verbs and nouns on a sticky note or virtual word cloud.
  - Activity Option #3: Use a Round Robin Protocol and ask participants to each share one skill they noticed in small groups. Discuss as a larger group.
  - Activity Option #4: Choose your own engaging and collaborative activity.

- Restart the video and play to the end. Have participants consider one implication understanding the embedded skills has on instruction and record one key takeaway on their participant guide.

PART 3: REPRESENTATIONS (~ 10 minutes)

- Show the third video **Digging Deeper into Mathematical Practice #5: Represent (2026) - PT. 3 Representations**

- **Pause the video at 1:10** and allow participants the opportunity to respond.
  - Activity Option #1: Utilize a self-reflection.
  - Activity Option #2: Employ a Think-Pair-Share Protocol and have educators reflect, pair up, then share out to the entire group.
  - Activity Option #3: Utilize technology to capture responses virtually, such as a word cloud, virtual whiteboard, or short response record. Discuss results as a group.

- Restart the video and play to the end. Have participants identify which of the five representations students have the most opportunity to work with in their classrooms. Which of the five, would they like to provide students with more opportunities to work with?

PART 4: PROFICIENCY (~ 20 - 25 minutes)

- Show the fourth video **Digging Deeper into Mathematical Practice #5: Represent (2026) - PT. 4 Proficiency**

- **Pause the video at 1:45** and allow participants the opportunity to respond.
  - Activity Option #1: Provide some reflection time for participants to record their thinking, then ask for volunteers to share skills they see embedded in the standard.
  - Activity Option #2: Provide giant sticky notes or poster boards for each category - Mastery, Proficient, Developing, and Beginning - then assign each group one category. Have each group write down comments regarding what it may be defined as in the context of the mathematical practice standard. Ask groups to place their findings somewhere visible, then employ a Gallery Walk or Jig Saw Protocol for reflection and review.
  - Activity Option #3: Provide giant sticky notes or poster boards for each category - Mastery, Proficient, Developing, and Beginning - then ask educators to freely rotate among these, adding thoughts they have to each. Provide no more than 5 minutes for this thinking, then encourage educators to revisit each category to reflect on the group's thinking.
  - Activity Option #4: Choose your own engaging and collaborative activity.

- **Restart the video and pause at 4:12**. Allow participants time the opportunity to respond.
  - Activity Option #1: Provide self-reflection time for educators to record their thinking, then ask for volunteers to share skills they see embedded in the standard.
  - Activity Option #2: Use a Round Robin Protocol to facilitate a small group discussion around this question.
  - Activity Option #3: Create physical or digital workspaces, such as a giant sticky note or virtual whiteboard, and allow participants to record one thing they observe in proficient students and one thing they observe in developing students within the context of this mathematical practice standard. Have volunteers share one response that resonated with them or prompted deeper thinking.
  - Activity Option #4: Choose your own engaging and collaborative activity.

Directions for this part continue on the next page.

PART 4: PROFICIENCY CONTINUED

- **Restart the video and pause at 7:34**. Allow participants time the opportunity to respond.
  - Activity Option #1: Select an embedded skill within this mathematical practice. Ask educators to consider a lesson or task where students have the opportunity to develop this skill. If you have educators who teach the same course or grade level, consider pairing them for this conversation. Ask educators to consider what they will observe in students at or beyond proficiency with this concept and skill.
  - Activity Option #2: Select a lesson or task if working with educators with similar roles. Ask the participants to consider skills within the math practice this may engage and define what they may observe in students at or above proficiency.
  - Activity Option #3: Allow for some self-reflection time, then ask educators to share with the group or tables. Consider using a Round Robin, Turn-and-Talk, or Think-Pair-Share Protocol to support this conversation.
  - Activity Option #4: Choose your own engaging and collaborative activity.

- **Restart the video at pause at 10:43.**
  - Activity Option #1: Consider using the activities previously provided to address the students who are at the developing or beginning stages of these skills within the context previously used.
  - Activity Option #2: Choose your own engaging and collaborative activity.

- **Restart the video and play to the end.** Have participants consider one implication understanding the embedded skills has on instruction and record one key takeaway on their participant guide.

PART 5: BUILDING RICH TASKS (~ 20 - 25 minutes)

- Show the fifth video **Digging Deeper into Mathematical Practice #5: Represent (2026) - PT. 5 Building Rich Tasks**
- **Pause the video at 1:40** and allow participants the opportunity to respond.
  - Activity Option #1: Provide some reflection time for participants to record their thinking, then ask for volunteers to share what they do in their class. You can share these responses using sticky notes, vocal sharing, or by utilizing technology tools to virtually display responses.
  - Activity Option #2: Choose your own engaging and collaborative activity.

- **Restart the video and pause at 5:45**. Allow participants time the opportunity to respond.
  - Activity Option #1: Ask participants to select a prompt and reflect on their response. Consider using a Turn-and-Talk, Think-Pair-Share, or other protocol to facilitate discussion.
  - Activity Option #2: Break participants into groups. Assign each group a prompt. Have the group respond to the prompt, then use a Jig Saw or Gallery Walk Protocol to share thinking with others.
  - Activity Option #3: Provide thinking time for all three prompts. Create concentric circles of educators. Ask them to respond to prompt number 1 with the person in front of them. Then rotate the concentric circle. Have educators share thoughts around prompt number 2 in their new pairing. Repeat a third time with prompt number three.
  - Activity Option #4: Choose your own engaging and collaborative activity.

- **Restart the video and pause at 6:10**. Allow participants time the opportunity to respond.
  - Activity Option #1: Provide some reflection time for participants to record their thinking, then ask for volunteers to share what they do in their class. You can share these responses using sticky notes, vocal sharing, or by utilizing technology tools to virtually display responses.
  - Activity Option #2: Choose your own engaging and collaborative activity.

- **Restart the video and pause at 8:21.** Allow participants time the opportunity to respond.
  - Activity Option #1: Provide some reflection time for participants to record their thinking, then ask for volunteers to share what they do in their class. You can share these responses using sticky notes, vocal sharing, or by utilizing technology tools to virtually display responses.
  - Activity Option #2: Choose your own engaging and collaborative activity.

PART 6 & CLOSING

PART 6: CONSOLIDATING LEARNING (~20 - 25 minutes)

- **Display the prompts shown at 3:00** during the video Digging Deeper into Mathematical Practice #5: Represent (2026) - PT. 6 Consolidating Learning

- Allow participants the opportunity to respond using the participant guide. You may choose to make this an engaging and collaborative activity or keep this as an individual reflection.

- **Skip to time 4:00** in the video to display the culminating activity for this session. Direct participants to use the participant guide to work through these steps. Provide opportunities to share and reflect on key takeaways.

Please note that these tasks provide the opportunity for educators to put what they learned into action. If time does not allow for these activities to be concluded within the session you are facilitating, consider setting up a follow up professional learning opportunity to conduct this work (e.g., during a PLC or department meeting).

CLOSING (~ 3-5 minutes)

- Thank participants for their attention and participation.

- Display the QR code to the feedback survey provided in video #6 at time **5:40.** Provide your own feedback using this survey. This evaluation will help support the development and improvement of these facilitator and participant guides in the future.

- Consider sharing your own feedback survey to evaluate the effectiveness of your facilitation and assess the impact of the learning.

- Collect all necessary information from participants required to issue professional development unit certificates for completion of this training. Issue professional development unit certificates to all educators who completed the training.

This page is structured to allow participants in an independent or facilitated activity to record their thinking. If participating in a facilitated course, please follow any additional instructions from your facilitator.

PART 1: IDENTIFYING DIFFERENCES

Watch the video **Digging Deeper into Mathematical Practice #5: Represent (2026) - PT. 1 Identifying Differences**

Record your thinking in response to the question at **02:23** here:

Record one key takeaway from video #1:

Published: March 7th, 2025

This page is structured to allow participants in an independent or facilitated activity to record their thinking. If participating in a facilitated course, please follow any additional instructions from your facilitator.

PART 2: UNPACKING THE STANDARD

Watch the video **Digging Deeper into Mathematical Practice #5: Represent (2026) - PT. 2 Unpacking the Standard.**

Record your thinking in response to the question at **01:28** here:

How does understanding the embedded skills better inform instruction of mathematics?

Record one key takeaway from video #2:

This page is structured to allow participants in an independent or facilitated activity to record their thinking. If participating in a facilitated course, please follow any additional instructions from your facilitator.

PART 3: REPRESENTATIONS

Watch the video **Digging Deeper into Mathematical Practice #5: Represent (2026) - PT. 3 Representations**.

Record your thinking in response to the question at **01:45** here:

Record your thinking in response to the question at **04:10** here:

Record one actionable takeaway from video #3, prioritizing something you can do in the coming days or lessons:

This page is structured to allow participants in an independent or facilitated activity to record their thinking. If participating in a facilitated course, please follow any additional instructions from your facilitator.

PART 4: PROFICIENCY

Watch the video **Digging Deeper into Mathematical Practice #5: Represent (2026) - PT. 4 Proficiency.**

Record your thinking in response to the question at **01:45** here:

Record your thinking in response to the question at **04:12** here:

Record your thinking in response to the question at **07:34** here:

Concept/Standard/Lesson:

Embedded Skill:

How will students show you they can represent within this context?

PART 4: PROFICIENCY CONTINUED

Watch the video **Digging Deeper into Mathematical Practice #5: Represent (2026) - PT. 4 Proficiency.**

Record your thinking in response to the question at **10:43** here:

Using the same context you provided in the previous box, what might you observe in students who are still requiring support to demonstrate this skill?

How will you support them within this context? (e.g., differentiation, intentional instructional design, accommodations, etc.)

Record one key takeaway from video #4:

This page is structured to allow participants in an independent or facilitated activity to record their thinking. If participating in a facilitated course, please follow any additional instructions from your facilitator.

PART 5: BUIDLING RICH TASKS

Watch the video **Digging Deeper into Mathematical Practice #5: Represent (2026) - PT. 5 Building Rich Tasks**

Record your thinking in response to the question at **1:40** here:

Record your thinking in response to the question at **5:45** here:

Record your thinking in response to the question at **6:10** here:

Record your thinking in response to the question at **8:21** here:

This page is structured to allow participants in an independent or facilitated activity to record their thinking. If participating in a facilitated course, please follow any additional instructions from your facilitator.

PART 6: CONSOLIDATING LEARNING

If participating in learning individually, watch the video **Digging Deeper into Mathematical Practice #5: Represent (2026) - PT. 6 Consolidating Learning**.

Pick one reflection to respond to:

REFLECTION #1:

Which types of representations (graphs, tables, equations, diagrams, physical models, etc.) do your students rely on most? Which ones do they struggle with? Plan one intentional question or activity that will push students to use an underutilized representation in an upcoming lesson or activity.

REFLECTION #2:

Mathematical representations help students organize, communicate, and make sense of information. Think about a time your students struggled to understand a concept in any subject. How might using a math representation (e.g., a graph, table, diagram, model) have supported their learning? How could you incorporate one next time?

REFLECTION RESPONSE:

This page is structured to allow participants in an independent or facilitated activity to record their thinking. If participating in a facilitated course, please follow any additional instructions from your facilitator.

PART 6: CONSOLIDATING LEARNING CONTINUED

Step 1 - Choose a Task: Educators select a math or non-math task from their own teaching experience. The task should involve a concept where representations could be used or improved to support learning. (e.g., a science experiment, a word problem, creating a budget, analyzing symmetry in an art lesson, etc.)

Step 2 - Analyze: Educators evaluate their chosen task using the following guiding questions:

- How does this task currently engage students in mathematical representations?
- Which MP5 skills (recognizing, using, creating, interpreting, translating, understanding) does it support?
- Where might students struggle? (e.g., choosing a representation, translating between forms, making sense of the math)

Analysis Response Space:

Digging Deeper MP#5

Participant Guide Continued

PART 6: CONSOLIDATING LEARNING CONTINUED

Step 3 - Refine: Educators revise or enhance their task by adding intentional MP5 elements:

- Encouraging Multiple Representations
- Requiring Translation Between Forms
- Deepening Interpretation
- Providing Strategic Choice & Flexibility

Step 4 - Share & Reflect: Reflect individually or share out:

- What did you change in your task?
- Which MP5 skill does this modification help build in students?
- What challenges might students still face, and how could you differentiate?

Reflection Workspace