

Teaching through Mathematical Processes Facilitator's Guide

What is the focus of this Professional Learning series?

This Professional Learning series focuses on deepening teachers' understanding of the Mathematical Processes and how they contribute to teaching through problem solving. It demonstrates how to support development of adolescents' mathematical problem-solving skills and encourages teachers to reflect on their practice. It is aligned with the criteria in the Student Success Action Planning Template for Mathematical Literacy.

Individuals and teams of educators can use the information and materials included in this resource to guide their professional dialogue, planning, and practice.

Facilitators can select and modify parts of the resource for use in addressing school and board action plans during professional learning sessions.

What are the components of this series?

- Six sessions written in the TIPS 2.0 template
- Blackline masters
- Slides and presenter's notes for each session
- Hyperlinks to video clips
- Rationale for learning goals and strategies used (Appendix A)

Opportunities for assessment for, as and of learning as well as ways to differentiate the professional learning are included in each session so that participants can experience for themselves key features of assessment and differentiation.

Appendix A: Problem Solving and the Mathematical Processes Rationale

Session	Learning Goals	Rationale for Goals	Rationale for Strategies Used <LS> Literacy Strategy
1	<ul style="list-style-type: none"> • Reflect and share about yourself as a teacher • Assess prior knowledge of the Mathematical Processes • Connect the process “name” to its mathematical meaning • Make connections between solving problems and the Mathematical Processes 	<ul style="list-style-type: none"> • Establishes a community of learners • Provides information to leaders as to participants’ prior knowledge • Begins to build a deeper understanding of each Mathematical Process • Realize that rich problems provide opportunities to engage in some or all of the processes 	<ul style="list-style-type: none"> • Non-threatening ice breaker • Anticipation Guide: assess participants’ prior knowledge of the math processes <LS> • Participants develop a deeper understanding of one of the Mathematical Processes by becoming an “expert” on one specific process <LS> • Matching activity consolidates understanding of each Mathematical Process
2	<ul style="list-style-type: none"> • Make connections among the Mathematical Processes • Reflect on how the processes appear in a math class using the TIPS Mathematical Processes package • Apply the Mathematical Processes to solving problems 	<ul style="list-style-type: none"> • Learn how to use the Mathematical Processes package in TIPS • Make connections between problem solving and mathematical processes 	<ul style="list-style-type: none"> • Demonstrates the connection between teaching through problem solving and teaching through the Mathematical Processes

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3	<ul style="list-style-type: none"> • Compare different problem solving solutions • Connect the Mathematical Processes to the curriculum expectations • Reflect on questions that focus on Mathematical Processes • Apply understanding of the connections between the Mathematical Processes and the curriculum expectations 	<ul style="list-style-type: none"> • Allows for differentiation of readiness, deepen mathematical understanding and make connections • Demonstrates that the Mathematical Processes are imbedded in the curriculum expectations • Builds awareness how the TIPS Continuum package connects to the Mathematical Processes • Demonstrates that question structure can link to specific Mathematical Processes 	<ul style="list-style-type: none"> • Comparing and discussing different solutions evokes and exposes thinking • Participants make conclusions after investigating expectations • Question development provides practice and discussion to increase understanding of questioning as it relates to the Mathematical Processes • “Guess the Process.” demonstrates the interconnectedness of the Mathematical Processes
4	<ul style="list-style-type: none"> • Apply understanding of the connections between the Mathematical Processes and the curriculum expectations • Make connections between questioning and DI 	<ul style="list-style-type: none"> • Increases confidence and consolidates learning 	<ul style="list-style-type: none"> • “Same/Different” and Frayer Model: shows the interconnectedness and uniqueness of the Mathematical Processes <LS> • Development of questions: <ul style="list-style-type: none"> – distinguishes the Mathematical Processes from each other and from the concepts and the procedures – look deeply at curriculum expectations • Gallery Walk: showcase work and allow for peer review/feedback <LS>

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5	<ul style="list-style-type: none"> • Develop strategies to assess understanding of the Mathematical Processes • Connect the Mathematical Processes to the Achievement Chart • Practise assessing through observation 	<ul style="list-style-type: none"> • Apply and practise what was learned about the Mathematical Processes rubric to increase confidence and consolidate learning 	<ul style="list-style-type: none"> • Think/Pair/Share: match the Mathematical Process to the rubric; discuss the rubric <LS> • Opposite Sides provides incentive to prove/disprove their conjectures <LS> • Fishbowl provides observational assessment practice using the Mathematical Processes rubric <LS>
6	<ul style="list-style-type: none"> • Reflect on the learning in the six sessions • Create a product to demonstrate the learning 	<ul style="list-style-type: none"> • Consolidates and deepens learning • Helps participants remember what they learned in a creative way 	<ul style="list-style-type: none"> • Graffiti puts all ideas forth for consideration <LS> • Inside-Outside Circle consolidate and share learning <LS>