Implementing a Professional Learning Model to Improve Mathematics Teaching
Webinar 2

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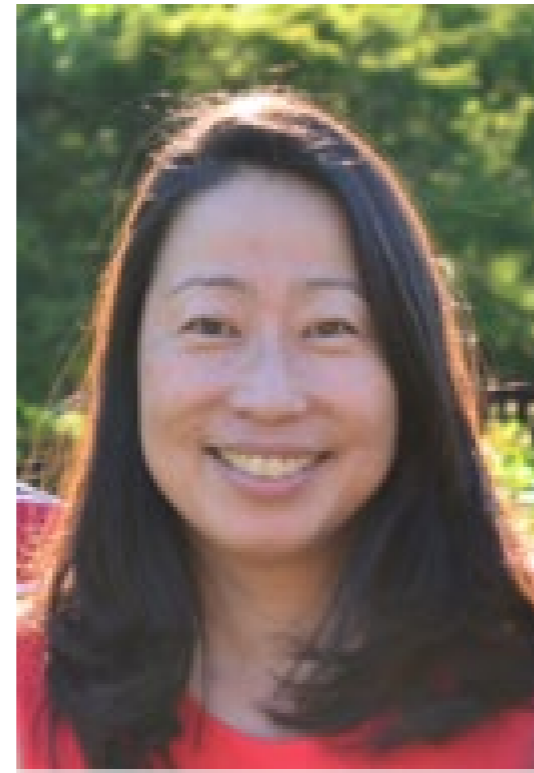Stephanie Haskins

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REL Appalachia at SRI International

Welcome

Laura Kassner
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Student Success in Mathematics partnership: REL Appalachia staff

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Agenda

- Welcome and overview

- Professional learning models: Documentation and data

- Professional learning model planning: Lessons from the field

- Next Steps

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Webinar series goals

Build participants' capacity to design and implement a coherent professional learning model (PLM) that:

- Incorporates interconnected, evidence-based professional learning experiences.

- Enhances leaders' ability to deliver high-quality mathematics instruction.

- Supports student achievement and success.

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Webinar 2 objectives

- Identify and describe possible data sources and methods to assess teacher professional development experiences and learning.

- Apply learning about data collection and analysis in order to develop a data collection plan as part of PLM planning.

- Identify key considerations when using a PLM to design future professional learning opportunities.

Note: An archive of the first webinar can be found here:
https://ies.ed.gov/ncee/edlabs/regions/appalachia/partners-VA-student-success-mathematics.asp

Professional Learning Models: Documentation and Data

Pam Buffington
Partnership Lead

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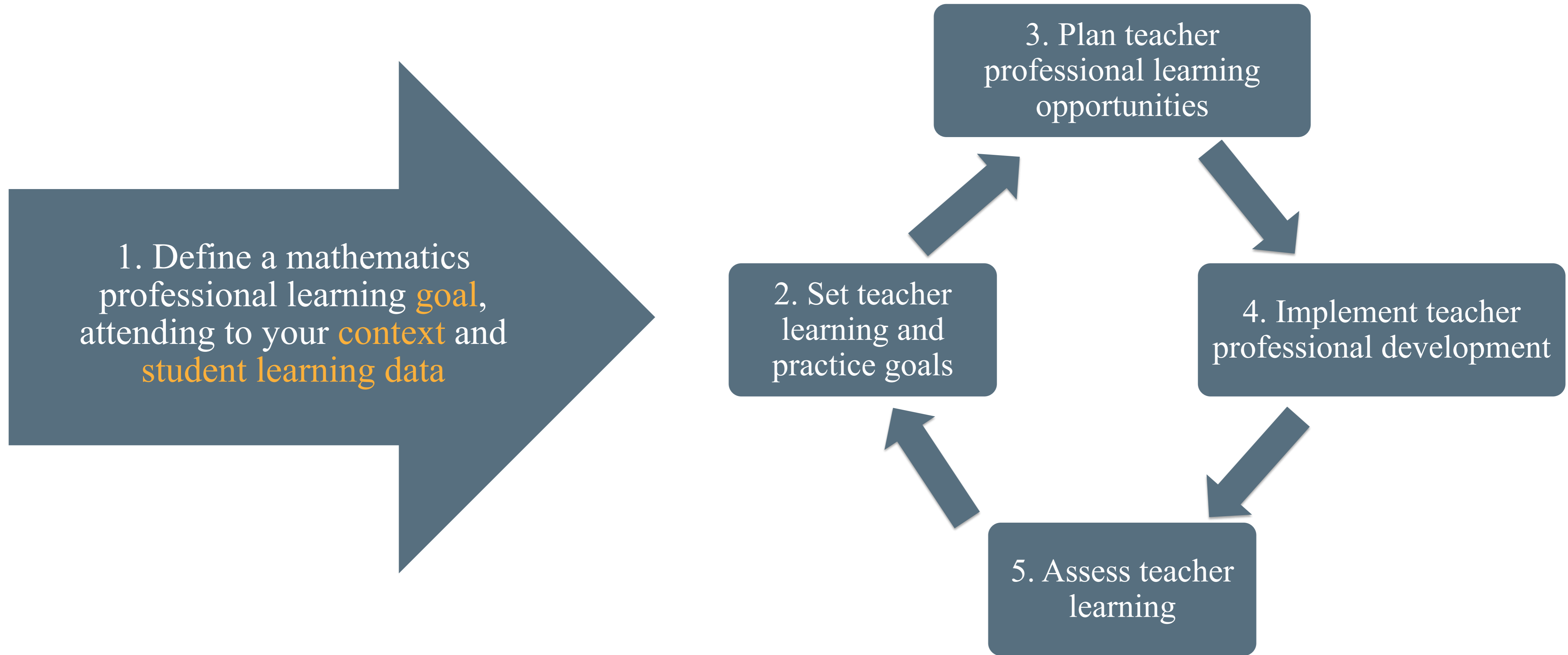
Documentation and data

Professional development evaluation helps leaders determine if and how professional learning activities are achieving their purposes.

(Guskey, 2002)

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Professional Learning Model (PLM)

1. Define a mathematics professional learning goal, attending to your context and student learning data

2. Set teacher learning and practice goals

3. Plan teacher professional learning opportunities

4. Implement teacher professional development

5. Assess teacher learning

Professional Learning Model (PLM)

- Complete the poll: How recently have you conducted a **mathematics professional learning activity** in your school division?
  - ❑ Within the last month
  - ❑ Within the last three months
  - ❑ During the 2020/21 school year but not within the last 3 months
  - ❑ In the summer prior to the 2020/21 school year
  - ❑ In 2019/20 or earlier

- Enter the topic of the mathematics professional learning activity you conducted in the chat.

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(National Council of Teachers of Mathematics, 2014)

Professional learning that increases educator effectiveness and results for all students uses a variety of sources and types of student, educator, and system data to plan, assess, and evaluate professional learning.

(Guskey, 2016, p. 33)

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Levels of assessment for professional learning activities

Handout 5

Level 1: Participants' reaction

Level 2: Participants' learning

Level 3: Organization support and change

Level 4: Participants' use of new knowledge and skills

Level 5: Student learning outcomes

(Guskey, 2016; Loucks-Horsley et al., 2010; National Council of Teachers of Mathematics, 2014)

Levels of assessment for professional learning activities

Handout 5

At each level:

- What questions are we asking?
- What data can be collected to answer these questions?
- What instruments and protocols will be used to collect data?
- How can the data be used?

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Level 1: Participants' reactions

Level	Questions you can ask at this level	Data you can collect to answer the questions	Instruments and protocols you can use to collect data	How you can use the data you collect
Level 1: Participants' reactions	• Did the participants like the workshop? • Did participants think that they spent their time well? • Did the material make sense? • Will the workshop be useful? • Was the leader knowledgeable and helpful?	• Participant feedback • Observer notes	• Participant survey after the workshop (figure 1) • Observations of the workshop or professional development session	• To understand participants' reactions to professional development • To improve program design and delivery

Example: Exit Ticket

→

Thank you for your participation in today's workshop. Please circle the statement that best describes your experience in the workshop to help us improve the design and facilitation of future workshops.				
1. To what extent did today's workshop **meet your professional learning needs?**	It addressed my professional learning needs **completely.**	It addressed **some** of my professional learning needs.	It **did not address** my professional learning needs.	I was **already familiar** with this topic, so it didn't help much.
2. To what extent was today's workshop **aligned with your school's priorities** for improving instruction?	The workshop content was **very closely aligned** with my school's priorities for instructional improvement.	The workshop content was **somewhat aligned** with my school's priorities for instructional improvement.	The workshop content **was not aligned** with my school's priorities for instructional improvement.	The workshop content was **inconsisten**t with my school's priorities for instructional improvement.

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Level 2: Participants' learning

Level	Questions you can ask at this level	Data you can collect to answer the questions	Instruments and protocols you can use to collect data	How you can use the data you collect
Level 2: Participants' learning	• Did participants acquire the intended knowledge and skills?	• Teacher knowledge • Teacher reflections • Observer notes	• Participant survey • Participant demonstrations in professional development • Participant reflections (oral and/or written) (figure 2) • Observation protocol (figure 3)	• To improve program content, format, and organization • To understand what participants learned during PD

Example:

Teacher Reflection

➡️

Thank you for your tremendous work in our workshop this week. Please respond to the question below about your learning related to the course goals.

1. Do you think you are getting better at using visual representations to solve mathematics problems by taking this course? Please explain in detail.

2. Which aspects of the course do you think have helped you get better at using visual representations to solve mathematics problems? Consider readings, math tasks, applets, discussions, notebook reflections, etc.

Level 3: Organization change and support

Level	Questions you can ask at this level	Data you can collect to answer the questions	Instruments and protocols you can use to collect data	How you can use the data you collect
Level 3: Organization support and change	• Were there opportunities for coaches and participants to plan for and discuss practice? • When, how, and with what frequency did coaches support new professional development practices?	• School records • Coaching logs	• Survey or form for generating feedback from division leaders, teachers, and school leaders (figure 4)	• To identify opportunities to support the teacher professional development • To improve organization of teacher professional development

Example: Mathematics Coaching Logs

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Mathematics Instructional Coaching Log		
Date	**Name**	**Notes**
2/12	Susan	Focused coaching on mathematical communication; interested in more formative assessment prompts
2/14	Akilah	Discussed importance of productive struggle and how to foster it
2/15	Derek	Used visual representations and discussed student examples

Date: Teacher:

	Mathematics Coaching Log
Date	**Pre-Conference**
	Focus of observation:
Date	**Observation**
	Notes:
Date	**Post-Conference**
Date	**Next Steps/Follow-up**

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Level 4: Participants' use of new knowledge and skills

Level	Questions you can ask at this level	Data you can collect to answer the questions	Instruments and protocols you can use to collect data	How you can use the data you collect
Level 4: Participants' use of new knowledge and skills	• Did participants implement new practices? • What challenges did participants face in implementing the new practices in the classroom?	• Observation notes • Teacher lesson plans	• Teacher surveys • Peer/coaching reviews • Observation protocol for all division leaders to use in observations of teachers or participants in professional development (Figure 5)	• To document and improve the implementation of new teaching practices and strategies

## Example:
Mathematics Classroom Observation Rubric

(Hufferd-Ackles et al., 2004)

	Teacher role	Questioning	Explaining mathematical thinking	Mathematical representations	Building student responsibility within the community
Level 0	Teacher is at the front of the room and dominates conversation.	Teacher is only questioner. Questions serve to keep students listening to teacher. Students give short answers and respond to teacher only.	Teacher questions focus on correctness. Students provide short answer-focused responses. Teacher may give answers.	Representations are missing, or teacher shows them to students.	Culture supports students keeping ideas to themselves or just providing answers when asked.
Level 1	Teacher encourages the sharing of math ideas and directs speaker to talk to the class, not to the teacher only.	Teacher questions begin to focus on student thinking and less on answers. Only teacher asks questions.	Teacher probes student thinking somewhat. One or two strategies may be elicited. Teacher may fill in an explanation. Students provide brief descriptions of their thinking in response to teacher probing.	Students learn to create math drawings to depict their mathematical thinking.	Students believe that their ideas are accepted by the classroom community. They begin to listen to one another supportively and to restate in their own words what another student has said.

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Level 5: Student learning outcomes

Level	Questions to ask at this level	Data to collect to answer these questions	Instruments and protocols that can be used to collect data	How the data can be used
Level 5: Student learning outcomes	• Did teacher learning affect student performance or achievement? • Are students more confident as learners? • Is student attendance improving?	• Student content assessments • Student self-efficacy surveys • Student attendance • Student grades	• Student assessment scores • Formative assessment on specific mathematics skills • Student mathematics engagement or self-efficacy survey (figure 6)	• To understand what students know • To understand how students understand themselves as math learners

Example: Student Mathematics Self-Concept
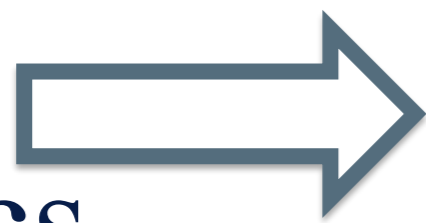
Math self-concept questions				
To what extent do you agree with the following statements?				
	Strongly Agree	Agree	Disagree	Strongly Disagree
I am just not good at mathematics	1	2	3	4
I get good grades in mathematics	1	2	3	4
I learn mathematics quickly.	1	2	3	4
I have always believed that mathematics is one of my best subjects.	1	2	3	4
In my mathematics class, I understand even the most difficult work.	1	2	3	4

(OECD, 2013)

(Organization of Economic Cooperation and Development, 2013)

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Reflections

- Reflect on the professional learning activity you chose earlier.
- Choose one outcome you had for that activity.
- What type of data did (or will) you collect?
  - Did you collect data to determine participants' reactions to the experience?
  - Did you collect data to assess the participants' learning?
  - Did you assess the participants' use or application of the knowledge and skills gained?
  - What student outcomes did you expect to change as a result of the teacher learning? What student data did, or will, you collect to determine if the professional learning influenced student outcomes?
- In the chat, enter the outcome you selected and one source of data you can collect to determine whether the outcome was achieved.

Professional Learning Models Planning: Lessons from the Field

Jill Neumayer DePiper
Partnership Staff

Stephanie Haskins
Partnership Member

PLM planning: Lessons from the field

Feedback from Student Success in Mathematics partner, Stephanie Haskins

- PLM overview
  - Strategies used and related goals
  - Data sources, data collection strategies, and how data were used
- Reflection on the experience

Questions for Student Success in Mathematics partnership member:

- How did Handout 5 help you reflect on the levels and types of data that you were collecting?

- How did Handout 5 help you plan for data collection and assessment of professional learning?

- What did your data analysis at one of the levels looks like?

- Can you share an example of how the data you collected and your analysis of how helped you plan subsequent teacher professional learning?

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Example professional learning approach

What data would you collect?

Part 2					
Identify the professional learning strategies, related details, and steps you will take to implement the strategies in your school division.					
Professional learning strategies (choose from below)		Grade(s) targeted	Contextual considerations	Technology tools and supports	Documentation and data
• Examining student work and thinking • Demonstration lessons • Action research	• Coaching • Mentoring • Study groups • Workshops or seminars • Other				
Strategy 1: Book study group organized around *Math Workshop: Five Steps to Implementing Guided Math, Learning Stations, Reflection, and More: Grades K-6* (Jennifer Lempp, 2017) Intended outcome: Increase teachers' knowledge of structures and routines to increase student-centered learning, implement rich tasks, and increase student math talk.		K-5	Very little student mathematical discourse in the classrooms. Lead teachers chosen to facilitate discussion of the book. All elementary teachers teach math 5 Meetings spread across the year.	Books and electronic versions of rich math tasks provided.	

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Considerations for data collection and assessing learning outcomes with a PLM

Part 2					
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• Examining student work and thinking • Demonstration lessons • Action research	• Coaching • Mentoring • Study groups • Workshops or seminars • Other				
Strategy 1:					

- How will you plan for collecting data?
- How will you decide which level to focus on for data collection?
- How will your professional learning context influence the type and amount of data you will collect?

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Handout 4: Professional Learning Model Planning Template

This template can be used to outline and develop a comprehensive plan for mathematics professional learning to support educators in your school division to help ensure that *all students* meet specific learning goals and can be successful in higher-level mathematics.

Part 1

Division-wide mathematics professional learning goal

The division will work towards….

Define how you will integrate attention to one or more of the Guiding Principles for School Mathematics[1]:	Describe which of the following Effective Mathematics Teaching Practices[2] will be in the foreground of this Professional Learning Model Plan:	
• Teaching and learning • Access and equity • Curriculum • Tools and technology • Assessment	• Establish mathematics goals to focus learning • Implement tasks that promote reasoning and problem solving • Use and connect mathematical representations • Facilitate meaningful mathematical discourse	• Pose purposeful questions • Build procedural fluency from conceptual understanding • Support productive struggle in learning mathematics • Elicit and use evidence of student thinking

[1] National Council of Teachers of Mathematics (NCTM). (2014). *Principles to action: Ensuring mathematical success for all.* NCTM.
[2] NCTM, 2014.

Part 2

Identify the professional learning strategies, related details, and steps you will take to implement the strategies in your school division.

Professional learning strategies (choose from below)		Grade(s) targeted	Contextual considerations	Technology tools and supports	Documentation and data
• Examining student work and thinking • Demonstration lessons • Action research	• Coaching • Mentoring • Study groups • Workshops or seminars • Other				
Strategy 1:					
Strategy 2:					
Strategy 3:					

(Lourcks-Horsley et al., 2010; National Council of Teachers of Mathematics, 2014)

Making your PLM Template a living document

- At a minimum, review your PLM Planning Template annually.

- Update the document based on goals achieved and new needs as they emerge.

- Consider existing and emerging evidence specific to the professional learning goals in your PLM Template.

Handout 1: Professional Learning Model Planning Template

This template can be used to outline and develop a comprehensive plan for mathematics professional learning to support educators in your school division to help ensure that *all students* meet specific learning goals and can be successful in higher-level mathematics.

Part 1

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What Works Clearinghouse (WWC) Practice Guides

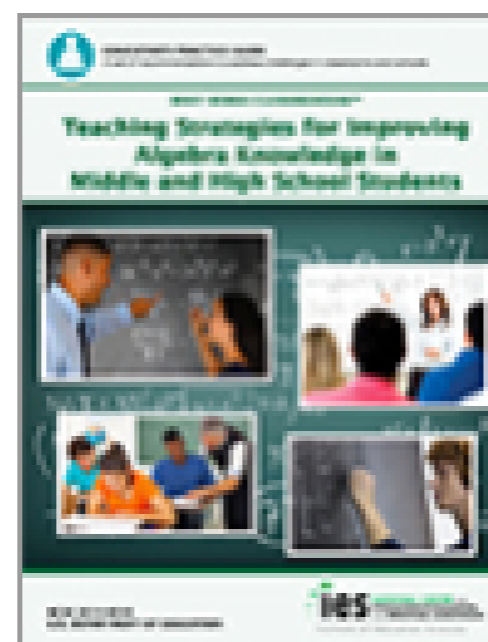**Teaching Math to Young Children**
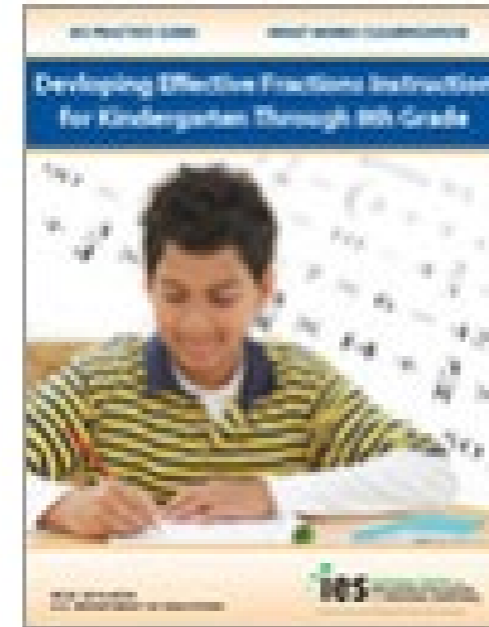
Developing Effective Fractions Instruction for Kindergarten Through 8th Grade
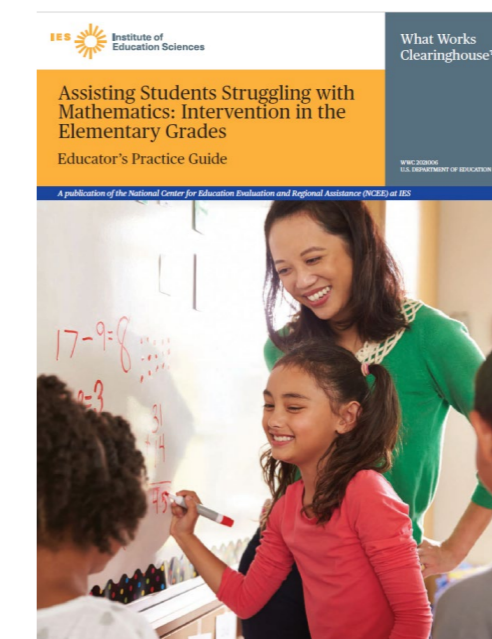
Improving Mathematical Problem Solving in Grades 4 Through 8

Encouraging Girls in Math and Science

Teaching Strategies for Improving Algebra Knowledge in Middle and High School Students

Assisting Students Struggling with Mathematics: Intervention in the Elementary Grades
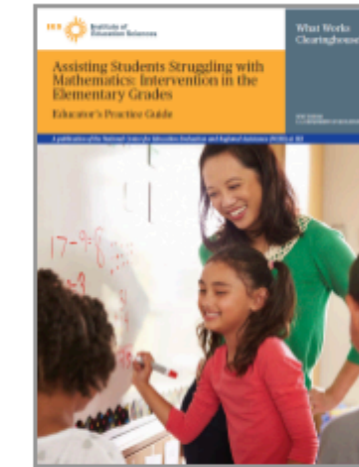
* Released March 2021

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Assisting Students Struggling with Mathematics: Intervention in the Elementary Grades

Released: March 2021
PDF (1.9 MB)

Recommendations   Details   Panel

This practice guide provides evidence-based practices that can help teachers tailor their instructional approaches and/or their mathematics intervention programs to meet the needs of their students.

1 Systematic Instruction: Provide systematic instruction during intervention to develop student understanding of mathematical ideas.

STRONG EVIDENCE

▾ Show More

2 Mathematical Language: Teach clear and concise mathematical language and support students' use of the language to help students effectively communicate their understanding of mathematical concepts.

STRONG EVIDENCE

▾ Show More

3 Representations: Use a well-chosen set of concrete and semi-concrete representations to support students' learning of mathematical concepts and procedures.

STRONG EVIDENCE

▾ Show More

4 Number Lines: Use the number line to facilitate the learning of mathematical concepts and procedures, build understanding of grade-level material, and prepare students for advanced mathematics.

STRONG EVIDENCE

▾ Show More

5 Word Problems: Provide deliberate instruction on word problems to deepen students' mathematical understanding and support their capacity to apply mathematical ideas.

STRONG EVIDENCE

▾ Show More

6 Timed Activities: Regularly include timed activities as one way to build fluency in mathematics.

STRONG EVIDENCE

▾ Show More

(Fuchs et al., 2021)

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Next Steps

Pam Buffington
Partnership Lead

Webinar 2 objectives: Review

- Identify and describe possible data sources and methods to use to understand teacher learning and the success of teacher professional development opportunities.

- Apply learning about data collection and analysis in order to develop a data collection plan as part of PLM planning.

- Identify key considerations when using a PLM to design future professional learning opportunities.

Reflecting on the day

1. What is something we discussed that **squared** with your experience?

2. What are **two points** you want to remember?

3. What are you still **wondering** about?

Questions?

Next steps

- Survey: https://sri.co1.qualtrics.com/jfe/form/SV_bCrun4dnZzBv15k

- Webinar series recording

- PLM compendium

Contact us

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Thank you!

🖥 https://ies.ed.gov/ncee/edlabs/regions/appalachia

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