

Student Success in Mathematics Partnership Meeting

April 21, 2021

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Welcome and Introductions



Laura Kassner
Partnership Liaison

Student Success in Mathematics partnership: REL AP staff



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Partnership Lead



Ryoko Yamaguchi
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Partnership Staff



Rebecca Schmidt
Research Staff



Laura Kassner
**Partnership
Liaison**



Anna Chiang
Partnership Liaison

Agenda

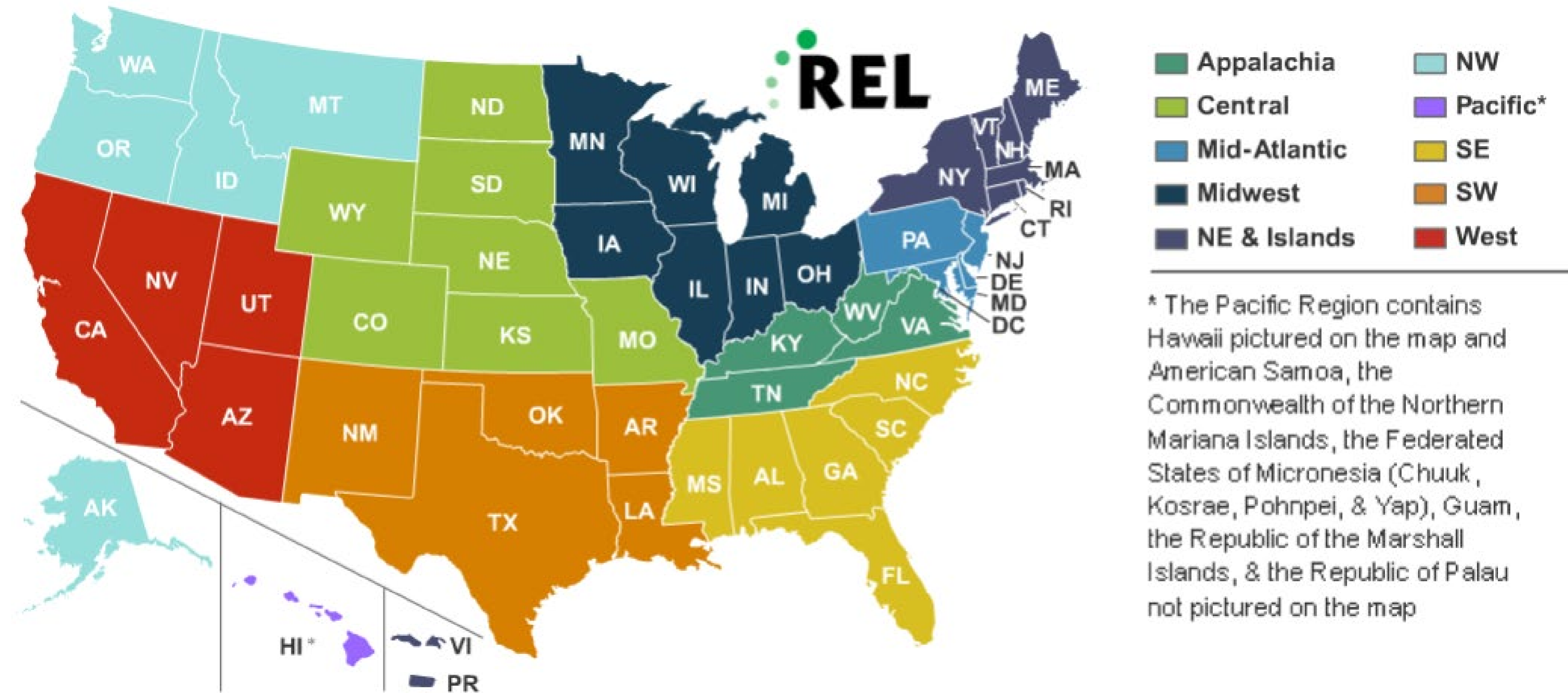
- Welcome and introductions
- Building capacity of school divisions to use student data to inform practice: Spotlight on Algebra I in grade 7
- Making the Professional Learning Model (PLM) Planning Template a living document
- Next steps



Meeting objectives

- Discuss learnings, wonderings, and next steps related to coaching for using math coursetaking data to inform policy, practice and increasing equitable access and success in schools.
- Familiarize partnership members with previously unexplored practice guides and other available IES resources to enhance future mathematics strategic initiatives.
- Support planning for sustained use of evidence-based resources.

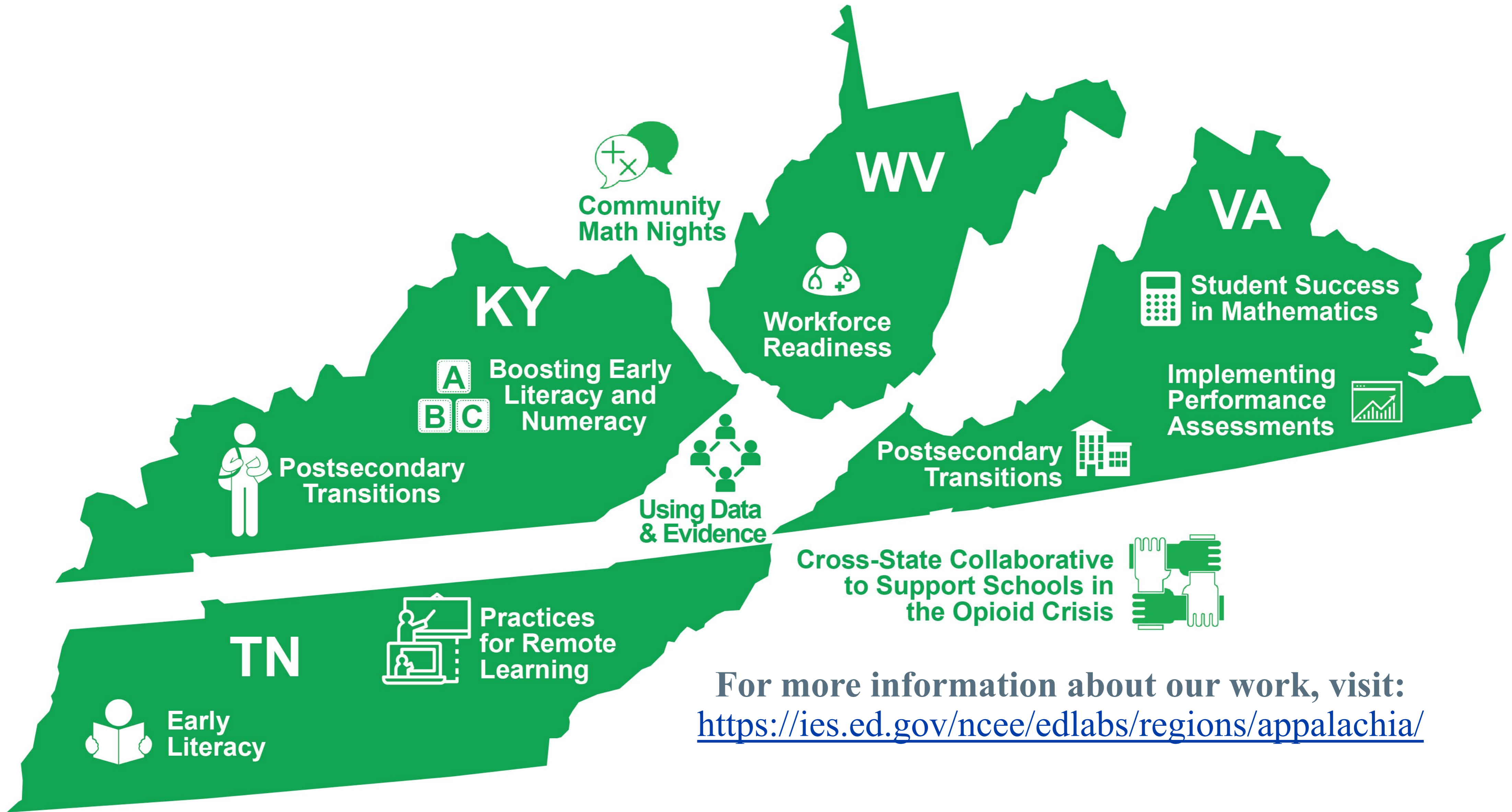
The Regional Educational Laboratories



The 10 RELs work in partnership with stakeholders to support a more evidence-based education system.

Administered by the U.S. Department of Education, Institute of Education Sciences (IES)

Find us on the web! <https://ies.ed.gov/ncee/edlabs/regions/appalachia/>




For more information about our work, visit:
<https://ies.ed.gov/ncee/edlabs/regions/appalachia/>

Applied Research

Training, Coaching, and Technical Support

Dissemination


Regional Educational Laboratory Appalachia
 At SRI International
 REL 2021-038
 U.S. DEPARTMENT OF EDUCATION


Algebra I and College Preparatory Diploma Outcomes among Virginia Students Who Completed Algebra I in Grades 7-9

A Publication of the National Center for Education Evaluation and Regional Assistance at IES




Supporting Your Child in Developing Math Skills For Future Success

Math success opens doors to college and careers.
 The technical and professional jobs of the future demand more mathematical knowledge and problem solving skills.




Children who believe they can be successful in math are more willing to put in effort, even when they struggle, and this results in better performance.¹
 Success in elementary school math predicts future achievement in middle and high school math and other subjects.^{2,3,4}
 Students who complete higher level math in high school earn higher incomes in the future.⁵
 The number of STEM (science, technology, engineering, and mathematics) jobs is growing and half of all STEM jobs are available to workers without a four-year college degree. STEM jobs pay 10% more than other jobs available to these workers.⁶

Families can support children in developing math skills for the future by⁷:



Great problem solving!
 Let's try a different method.
 $ax + bx + c = 0$

praising effort and modeling positive math attitudes.
 encouraging children to seek help and try new strategies when they are stuck.
 confronting stereotypes about who is good at math.


 1. Boaler, J. (2015). Mathematical mindsets: Unleashing students' potential through creative math, inspiring messages and innovative teaching. San Francisco, CA: John Wiley & Sons.
 2. Claessens, A., & Engel, M. (2013). How important is where you start? Early mathematics knowledge and later school success. Teachers College Record, 115(4), 1-29. <http://eric.ed.gov/?id=EJ1020177>
 3. Siegler, R. S., Duncan, G. J., Davis-Kean, J. E., Duckworth, K., Claessens, A., Engel, M., & Chen, M. (2012). Early predictors of high school mathematics achievement. Psychological Science, 23(7), 671-677.
 4. Achieve, Inc. (2004). Closing the expectations gap: An annual 50-state progress report on the alignment of high school policies with the demands of college and work. Washington, DC: Author.
 5. Rothwell, J. (2012). The Hidden STEM Economy. Brookings Institution, Washington, DC.
 6. Epstein, J.L. (2001). School, family, and community partnerships. 1st ed. Boulder, CO: Westview Press.

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Building Capacity of School Divisions to Use Student Data to Inform Their Practice: Spotlight on Algebra I in Grade 7



Ryoko Yamaguchi
Research Lead



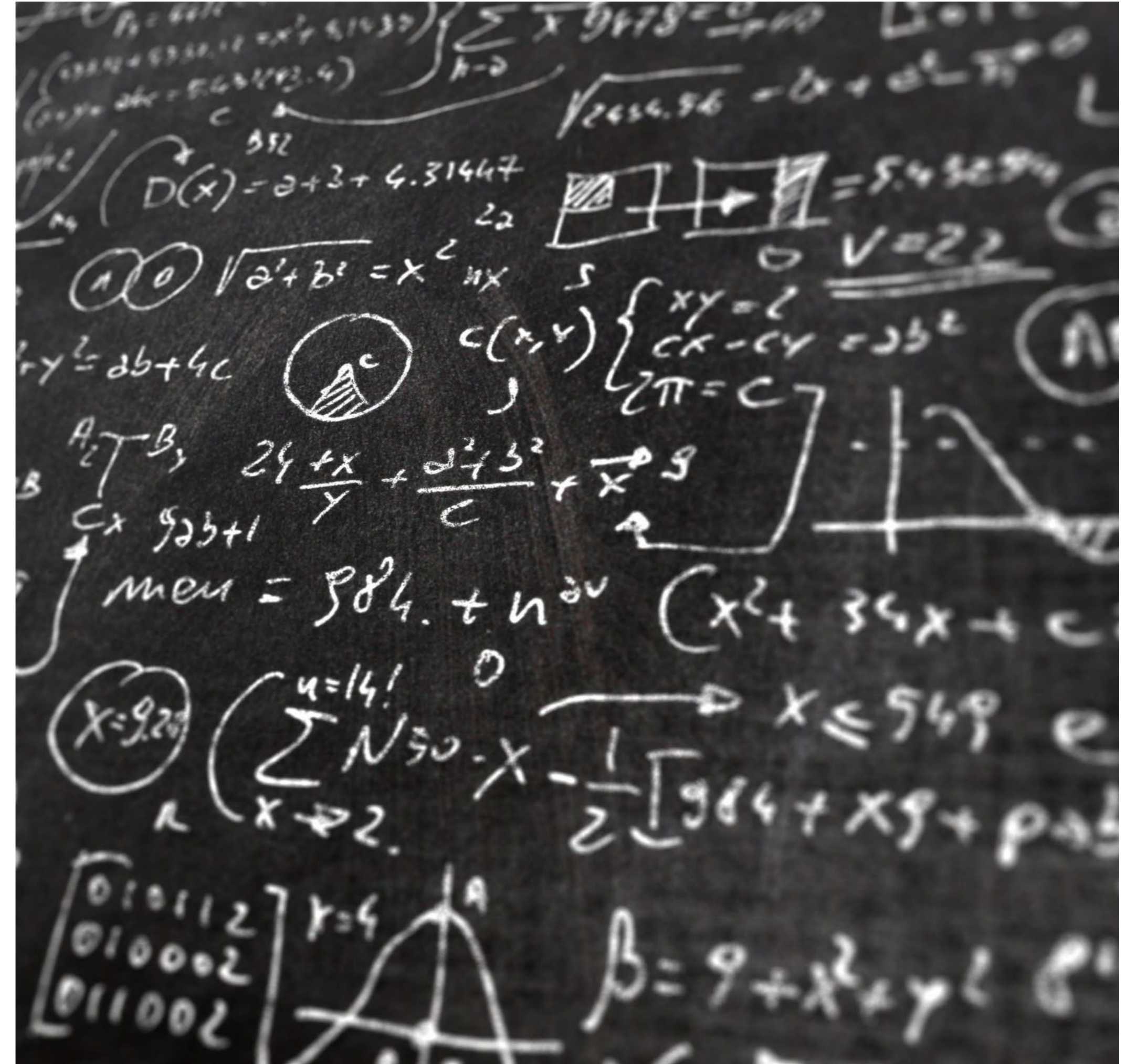
Rebecca Schmidt
Research Staff



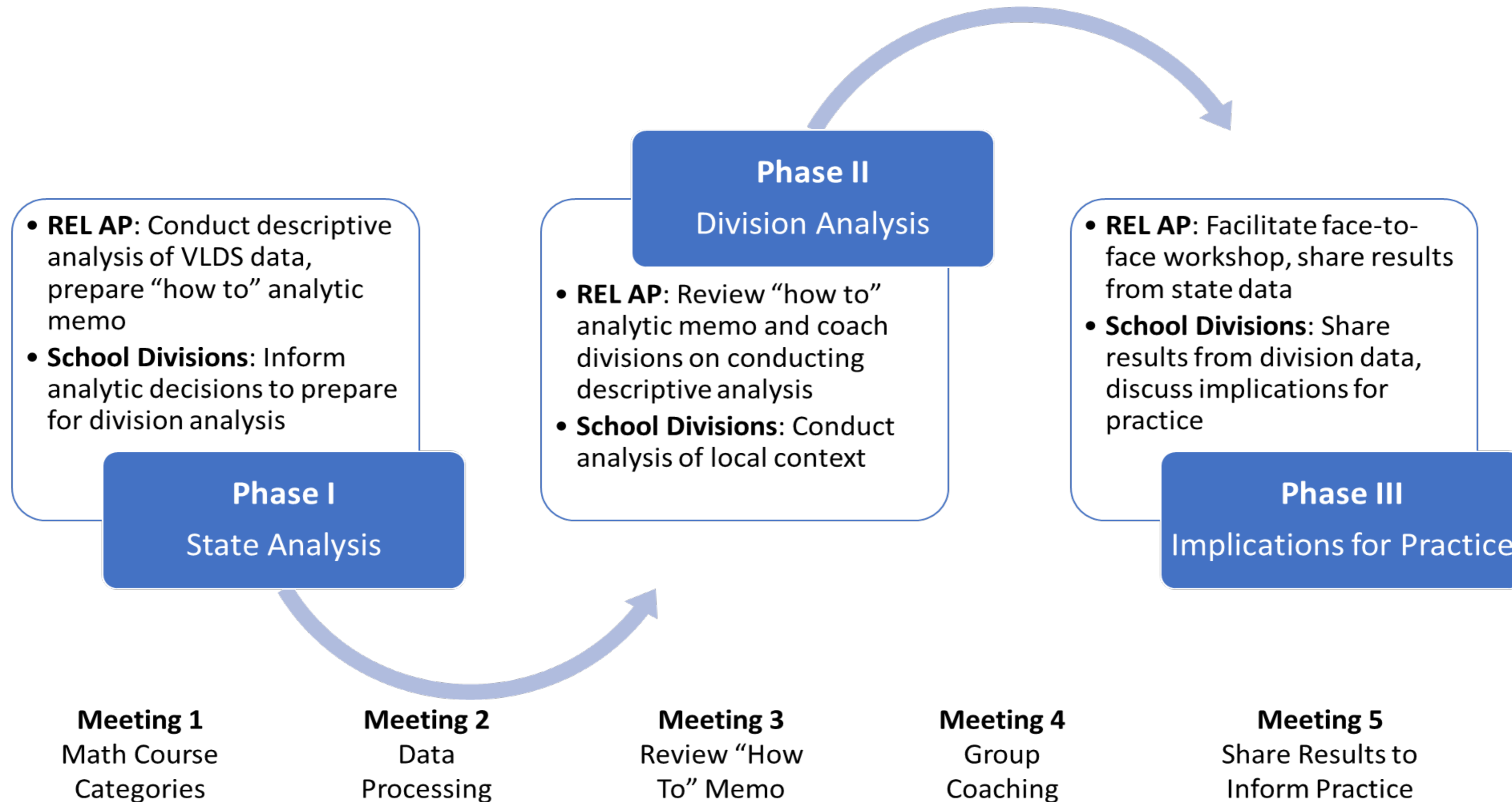
Pam Buffington
Partnership Lead

Completing Algebra I in grade 7

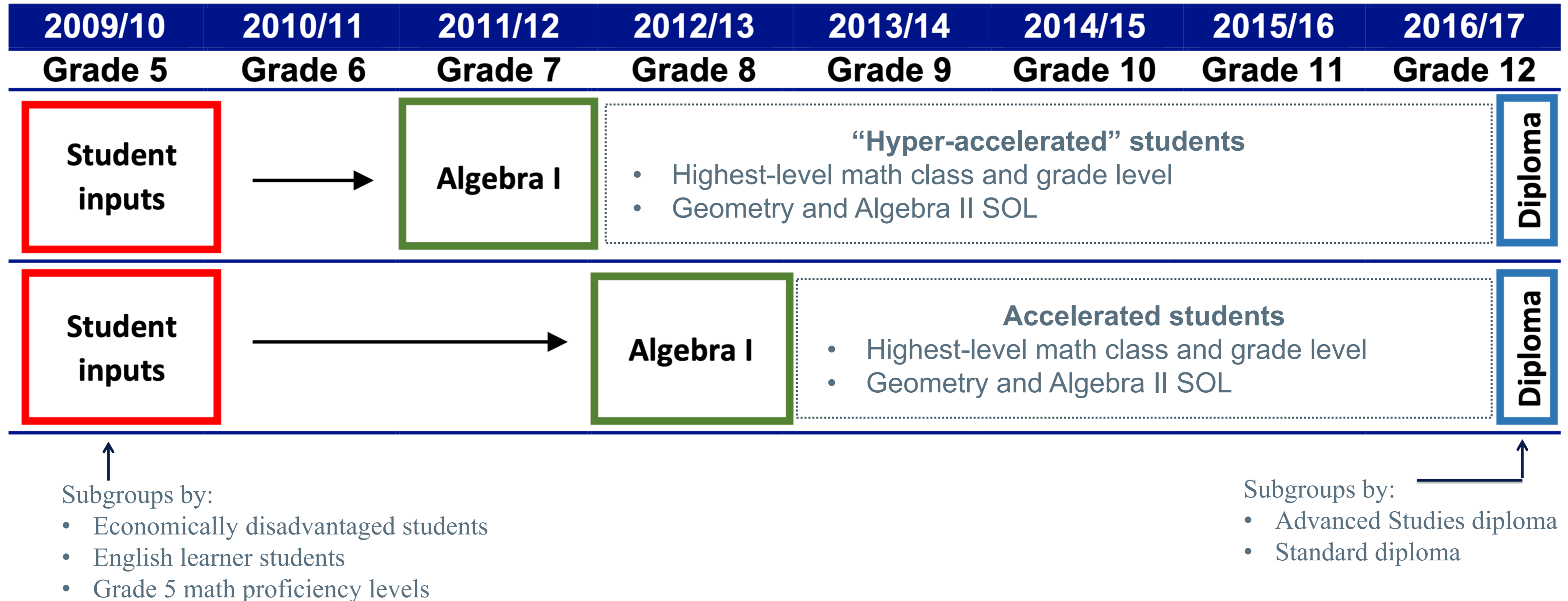
- Background of the coaching project
- What is the data story for students who completed Algebra I in grade 7? How do they compare with students who completed Algebra I in grade 8?
 - Statewide
 - Division-level
- Lessons and next steps for improving policies and practices



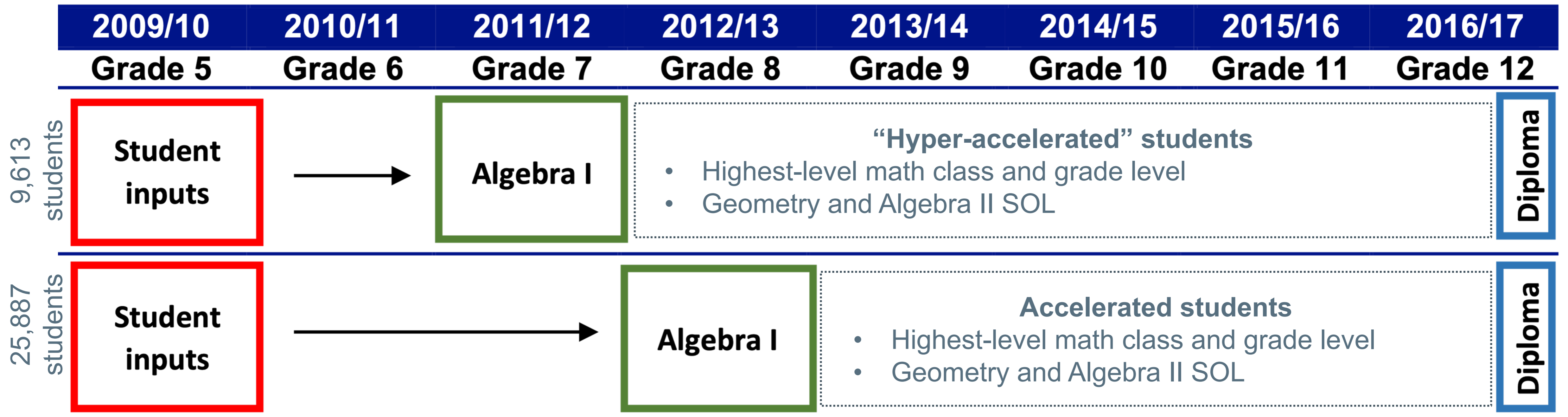
Project background: Building capacity of school divisions to use student-level data to inform policies and practices



What is the story of students who completed Algebra I in grade 7? How does it compare with grade 8?



What is the story of students who completed Algebra I in grade 7? How does it compare with grade 8?



	Completed Algebra I in	Grade 7	Grade 8
	English learner	2%	4%
	Economically disadvantaged	24%	29%
	Gifted and talented education	49%	29%
	Grade 5 math Advanced Proficient	93%	75%
	Grade 5 math Proficient	7%	23%
	Grade 5 math Below Proficient	<1	3%

Source: Yamaguchi et al., 2020

VLDS data

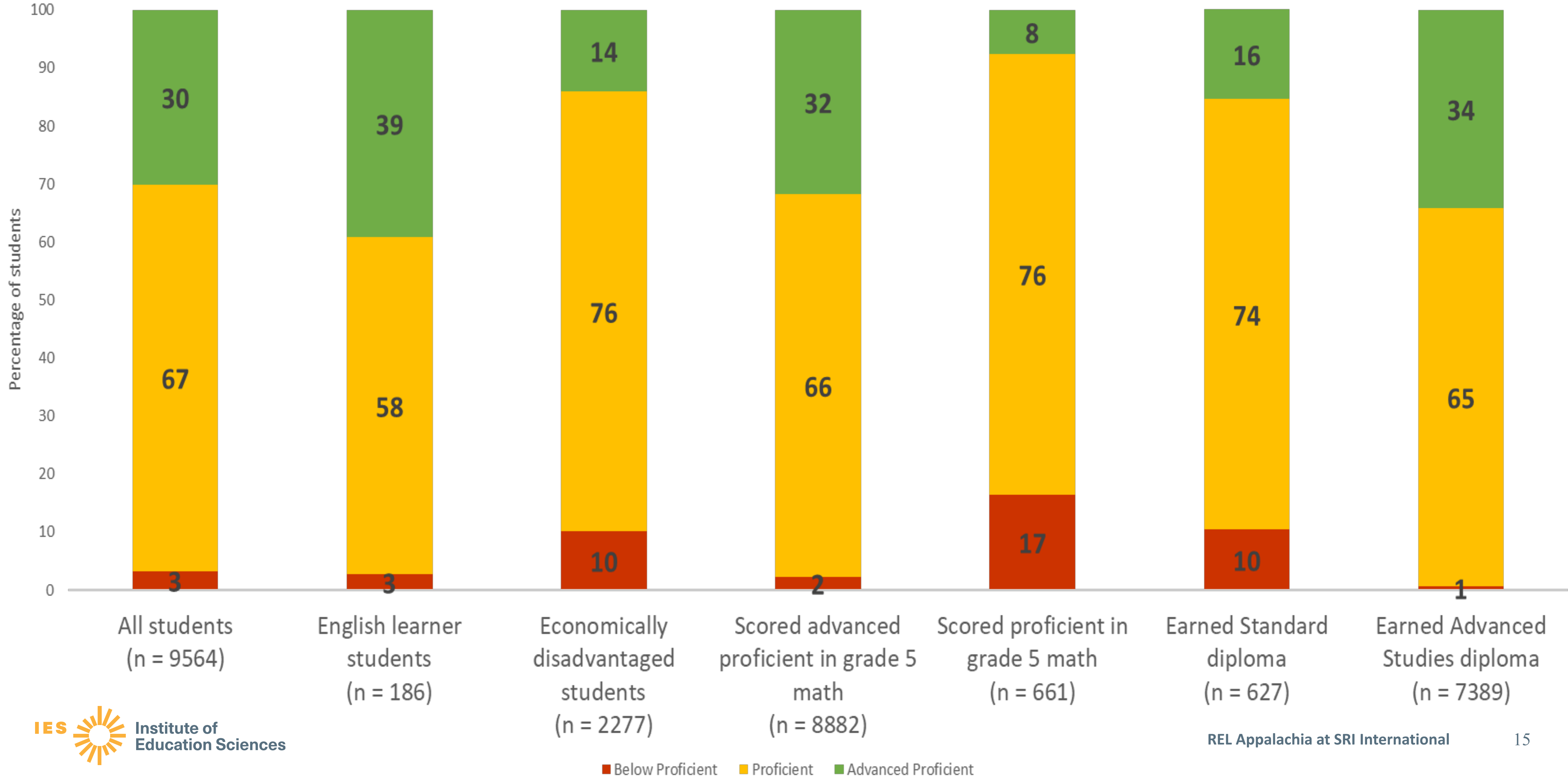
State population of students who completed Algebra I in grade 7

- 9,613 students from the report
- Merged with geometry state assessment = 9,564 (retained 99.5%)
- Merged with Algebra II state assessment = 9,364 (retained 97.4%)

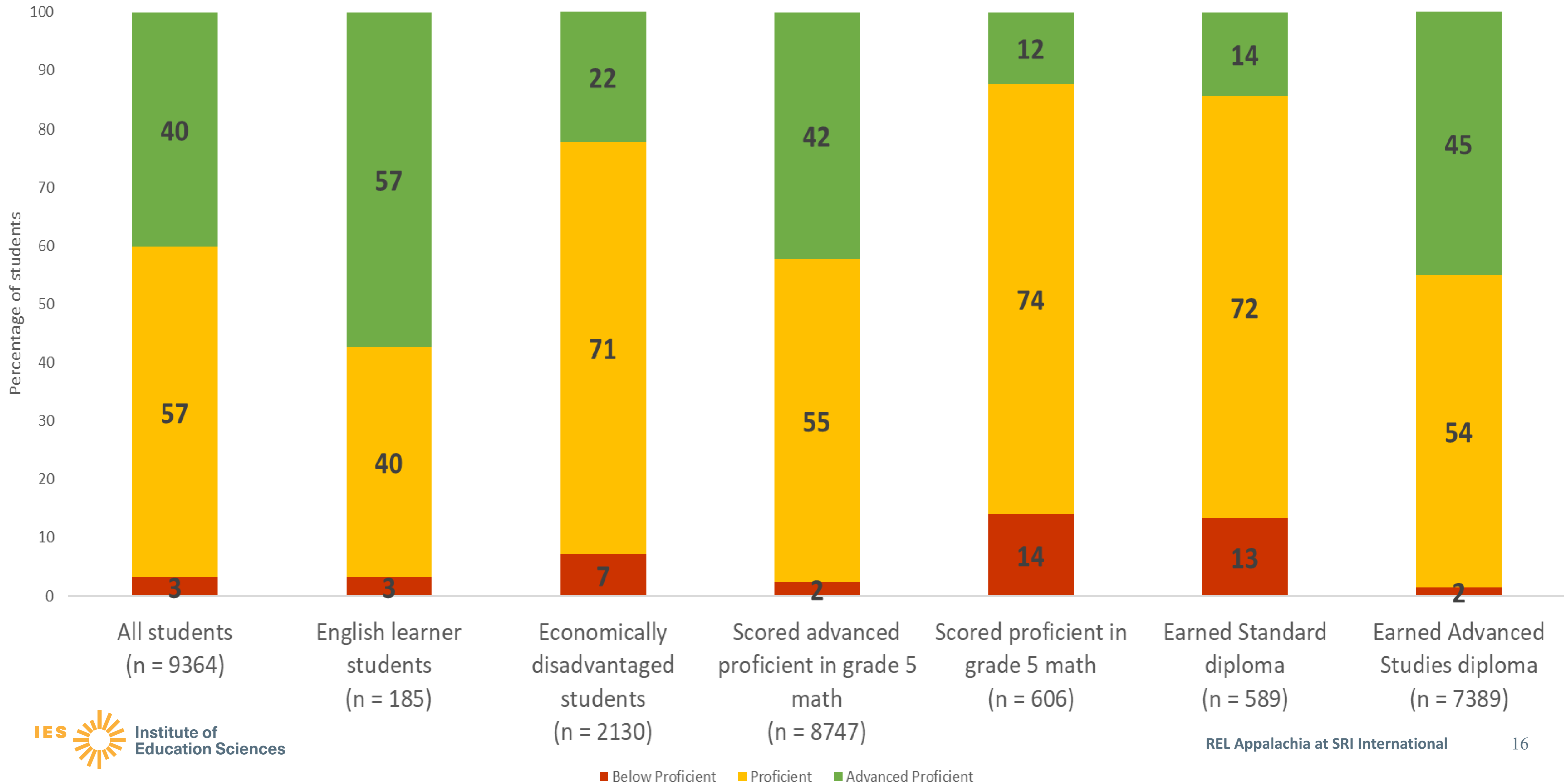
State population of students who completed Algebra I in grade 8

- 25,887 students from the report
- Merged with geometry state assessment = 25,596 (retained 98.9%)
- Merged with Algebra II state assessment = 23,752 (retained 91.8%)

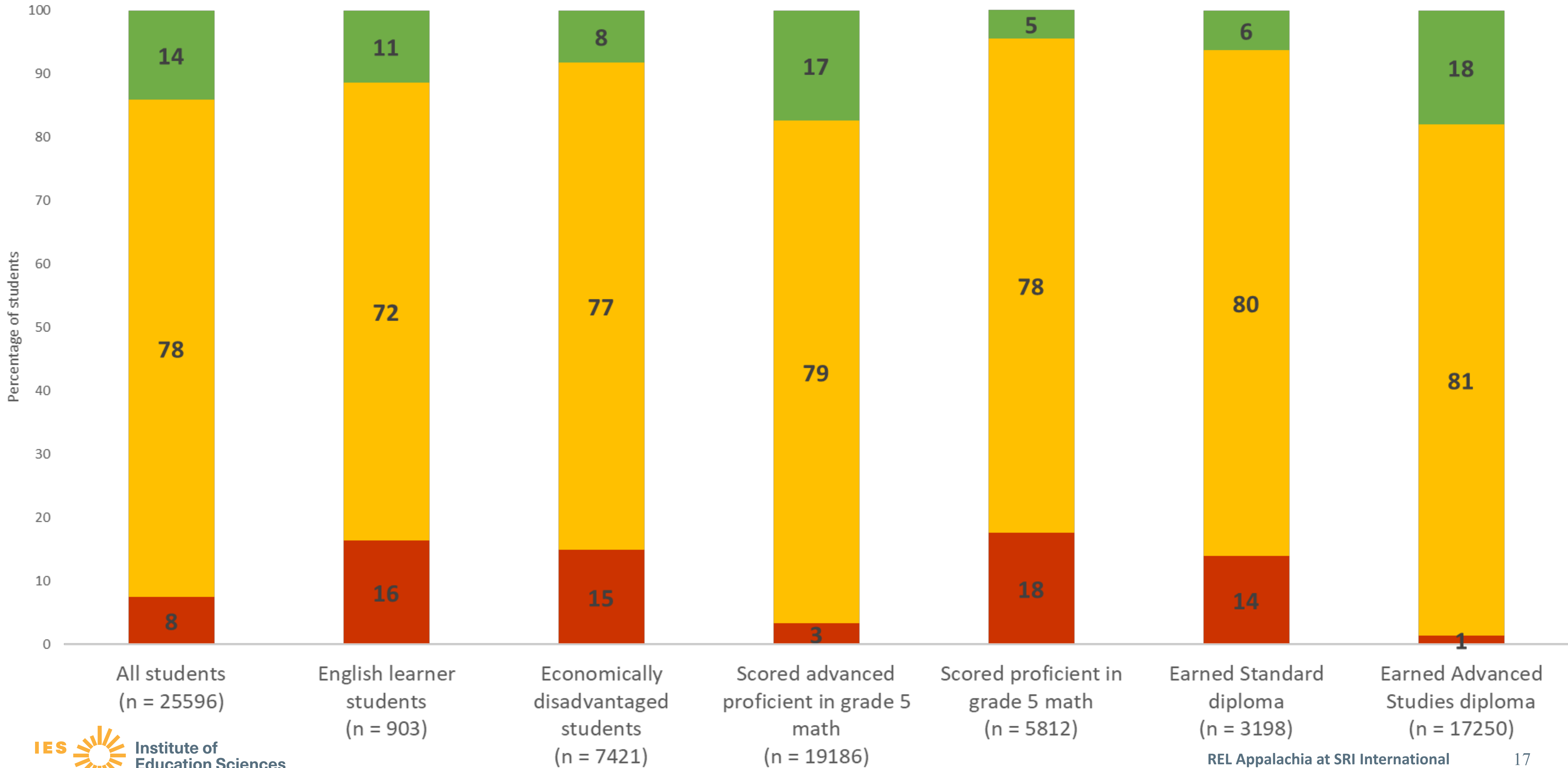
Among students who completed Algebra I in **grade 7**, the percentage of students who scored Advanced Proficient, Proficient, and Below Proficient in GEOMETRY



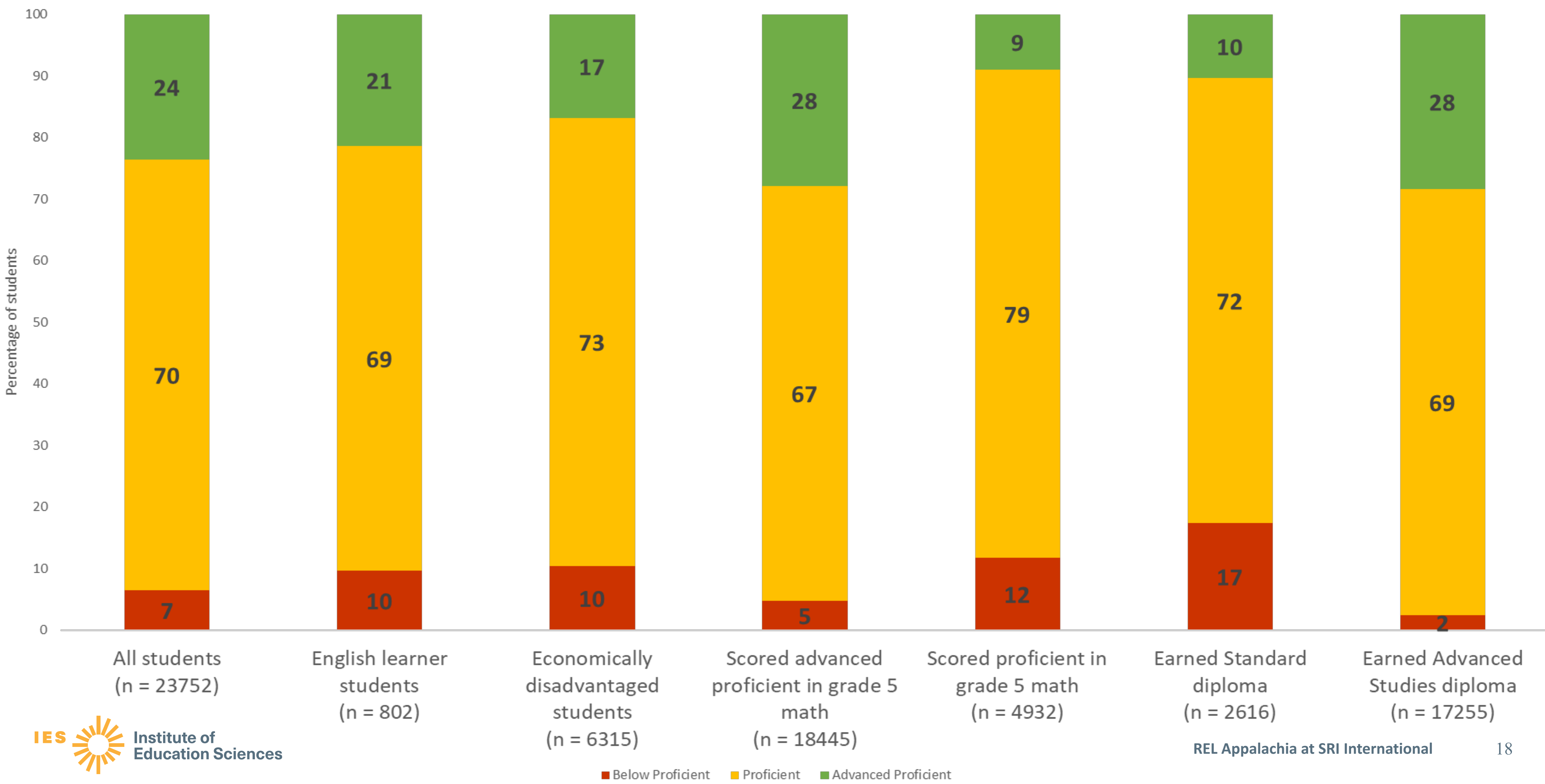
Among students who completed Algebra I in **grade 7**, the percentage of students who scored Advanced Proficient, Proficient, and Below Proficient in ALGEBRA II



Among students who completed Algebra I in **grade 8**, the percentage of students who scored Advanced Proficient, Proficient, and Below Proficient in GEOMETRY



Among students who completed Algebra I in **grade 8**, the percentage of students who scored Advanced Proficient, Proficient, and Below Proficient in ALGEBRA II



What is the story of students who completed Algebra I in grade 7?



Charlottesville City Schools

- Dave Uhlig, database administrator
- Patrick Moctezuma, coordinator of management information
- Carolyn Swift, mathematics coordinator



Staunton City Schools

- Justin Eckard, information systems specialist
- Stephanie Haskins, executive director of instruction



Harrisonburg City Schools

- Shannon Davis, database specialist
- Brian Nussbaum, secondary mathematics coordinator
- Amy Henderson, elementary mathematics coordinator

Let's unpack the story for lessons and next steps for improving policies and practices

Refer to Handout 1



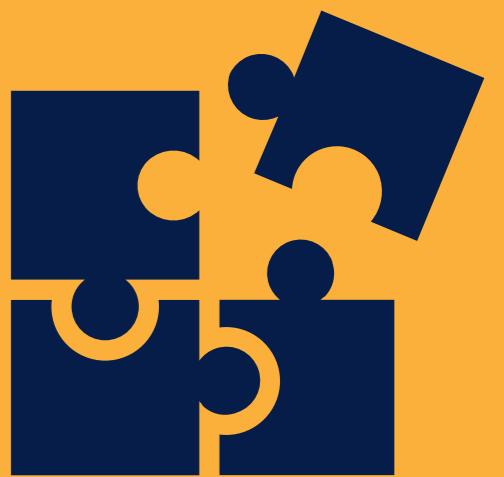
Making the Professional Learning Model (PLM) Planning Template a Living Document



Pam Buffington
Partnership Lead



Jill DePiper
Partnership Staff



Making your PLM a living document

- 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

Division-wide mathematics professional learning goal

The division will work towards...

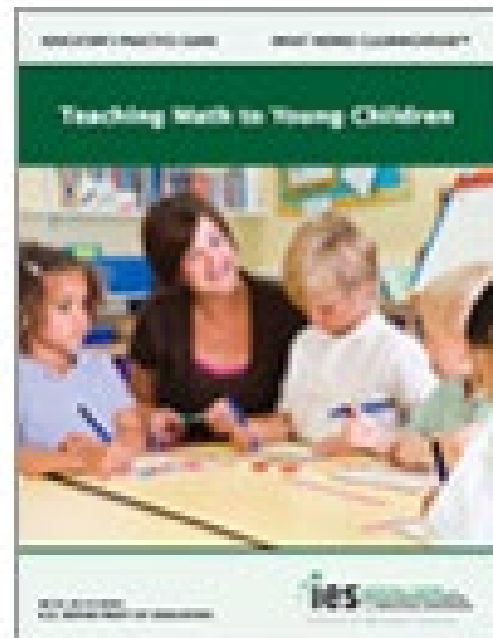
Define how you will integrate attention to one or more of the Guiding Principles for School Mathematics¹:

- Teaching and learning
- Access and equity
- Curriculum
- Tools and technology
- Assessment

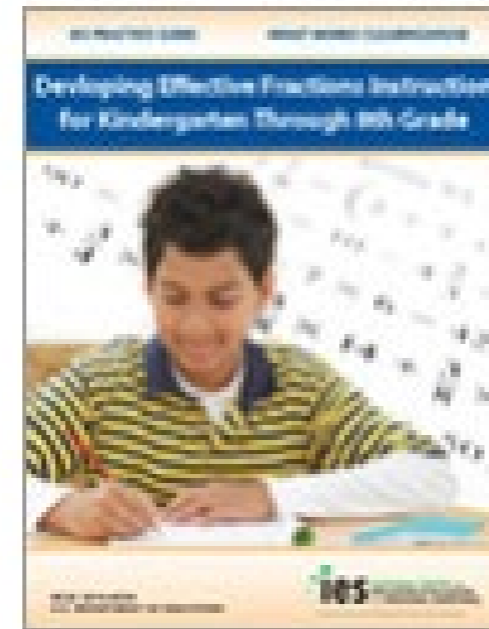
Describe which of the following Effective Mathematics Teaching Practices¹ will be in the foreground of this Professional Learning Model Plan:

- 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

WWC Practice Guides



Teaching Math to Young Children



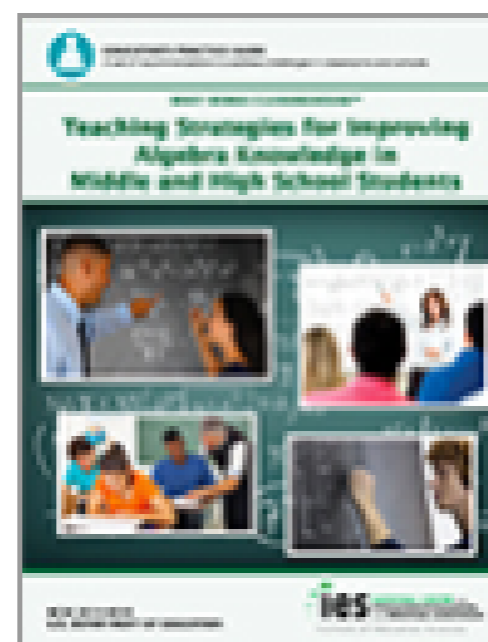
Developing Effective Fractions Instruction for Kindergarten Through 8th Grade



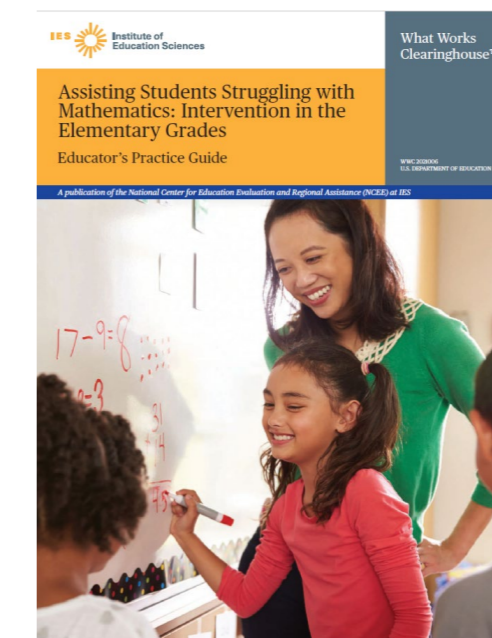
Improving Mathematical Problem Solving in Grades 4 Through 8



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

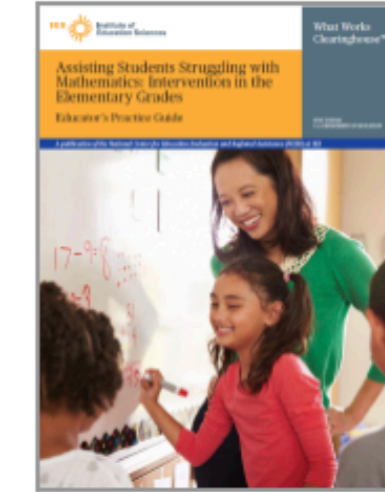
*** Released March 2021**



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.

<p>1 Systematic Instruction: Provide systematic instruction during intervention to develop student understanding of mathematical ideas.</p> <p> STRONG EVIDENCE</p> <p>▼ Show More</p>	<p>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.</p> <p> STRONG EVIDENCE</p> <p>▼ Show More</p>	<p>3 Representations: Use a well-chosen set of concrete and semi-concrete representations to support students' learning of mathematical concepts and procedures.</p> <p> STRONG EVIDENCE</p> <p>▼ Show More</p>
<p>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.</p> <p> STRONG EVIDENCE</p> <p>▼ Show More</p>	<p>5 Word Problems: Provide deliberate instruction on word problems to deepen students' mathematical understanding and support their capacity to apply mathematical ideas.</p> <p> STRONG EVIDENCE</p> <p>▼ Show More</p>	<p>6 Timed Activities: Regularly include timed activities as one way to build fluency in mathematics.</p> <p> STRONG EVIDENCE</p> <p>▼ Show More</p>

Visualizing Fractions

Proper Fractions

Multiple Models for Proper Fracti...

Multiple Models for Proper Fracti...

Visualize Equivalent Proper Fract...

Improper Fractions

Fractions on a Number Line

Comparing Fractions

Adding Fractions


Multiplying Fractions

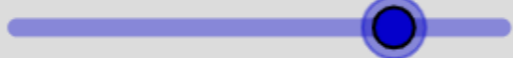
Dividing Fractions

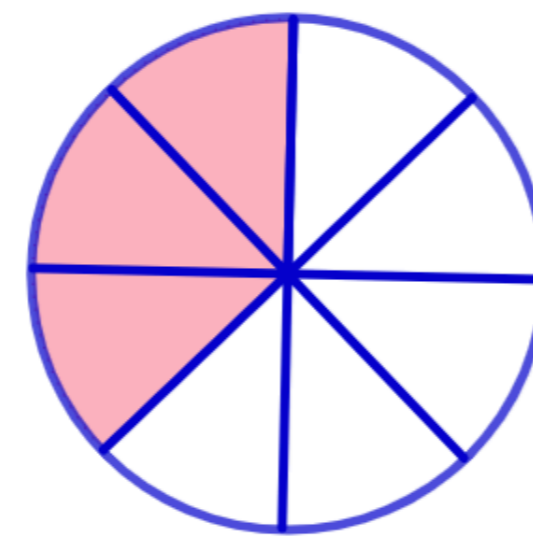
Multiple Models for Proper Fractions

Author: EDC in Maine

Change

3 

8 



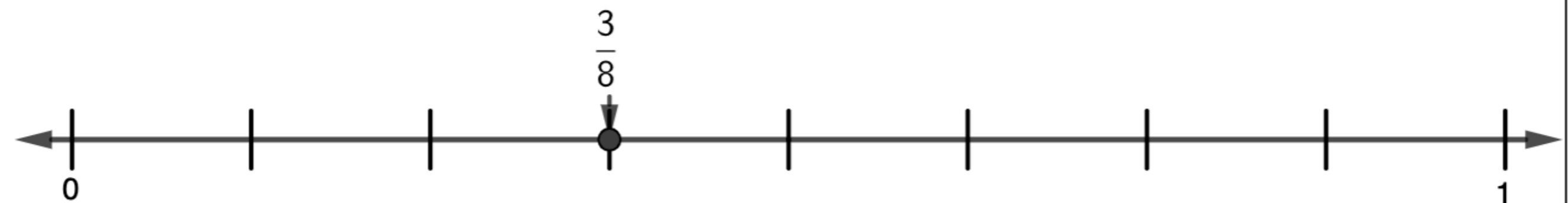
Area models 

Set models

Number line model

Decimal equivalent

Linear models



The interval size for the number line and linear models is: $\frac{1}{8}$

Professional Learning Model Action Planning Template

- Consider Recommendation 4 from the *Assisting Students Struggling with Mathematics: Intervention in the Elementary Grades* practice guide and the GeoGebra applet set demonstrated.
- How would you design a professional learning activity to support the enactment of this recommendation from the practice guide while integrating the GeoGebra applets?

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		
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 ¹ will be in the foreground of this Professional Learning Model Plan:	
<ul style="list-style-type: none"> Teaching and learning Access and equity Curriculum Tools and technology Assessment 	<ul style="list-style-type: none"> Establish mathematics goals to focus learning Implement tasks that promote reasoning and problem solving Use and connect mathematical representations Facilitate meaningful mathematical discourse 	<ul style="list-style-type: none"> Pose purposeful questions Build procedural fluency from conceptual understanding Support productive struggle in learning mathematics Elicit and use evidence of student thinking

Practice planning to enact a practice guide recommendation

Choose a recommendation from the practice guide.

Imagine how you will design professional learning to enact the recommendation in your school division.

- What professional learning strategy will you choose and what steps will need to be taken to implement it?
- What grade(s) will you focus on?
- What are the current contextual considerations in your school division, and what technology tools or supports will you choose?
- What data will you collect to determine if the professional learning is successful? How will you collect the data?

Share your thinking.

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	Documentatio n and data
<ul style="list-style-type: none"> • Examining student work and thinking • Demonstration lessons • Action research 	<ul style="list-style-type: none"> • Coaching • Mentoring • Study groups • Workshops or seminars • Other 				
Strategy 1:					
Strategy 2:					
Strategy 3:					

Next Steps



Pam Buffington
Partnership Lead



Webinar series

- Webinar 1 recap
- Webinar 2: May 12, 3:30 p.m. – 4:40 p.m.

Next steps

- Questions/concerns
- Stakeholder Feedback Survey (SFS) after this meeting
- Next meeting



Contact us

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<https://ies.ed.gov/ncee/edlabs/regions/appalachia>



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References

Fuchs, L.S., Newman-Gonchar, R., Schumacher, R., Dougherty, B., Bucka, N., Karp, K.S., Woodward, J., Clarke, B., Jordan, N. C., Gersten, R., Jayanthi, M., Keating, B., and Morgan, S. (2021). *Assisting Students Struggling with Mathematics: Intervention in the Elementary Grades* (WWC 2021006). Washington, DC: National Center for Education Evaluation and Regional Assistance (NCEE), Institute of Education Sciences, U.S. Department of Education.
<https://ies.ed.gov/ncee/wwc/PracticeGuide/26>

Multiple Models for Proper Fractions. <https://www.geogebra.org/m/DV6Ehjsx#material/n6wDwtSS>

What Works Clearinghouse Practice Guides. <https://ies.ed.gov/ncee/wwc/PracticeGuides>

Yamaguchi, R., Jonas, D. L., Schmidt, R.A., Sieber, M., Buffington, P., Neumayer DePiper, J., & Araoz, C. (2020). *Algebra I and college preparatory diploma outcomes among Virginia students who completed Algebra I in grades 7–9*. (REL 2020-036). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Appalachia.
<http://ies.ed.gov/ncee/edlabs>.