Math314

learn lead share

Washington University in St. Louis

Institute for School Partnership

The Institute for School Partnership at Washington University in St. Louis

Connect schools · Inspire students · Empower educators

A message from the Chancellor,

At Washington University, we are committed to strengthening St. Louis by investing in our future leaders. The Institute for School Partnership at WashU has worked toward educational equity in the region's K-12 schools for 30 years and is dedicated to ensuring all young learners can participate in programs that expand their economic and educational opportunities. We do this by building bridges between our talented and passionate faculty and under-resourced schools to train leaders, invest in teachers, boost science curriculum — and now with the launch of Math314, enhance mathematics programs across the region.

Our Washington University faculty and staff are proud to partner with the local educational community and consider it a privilege and duty to connect our cutting-edge research with the dedicated teachers who can put it into action in the classroom. Together, we're capturing the curiosity and cultivating the potential of a new generation of community leaders who will go on to serve this great city.

Andrew D. Martin
Chancellor

Math314

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Why do we care about math competency?

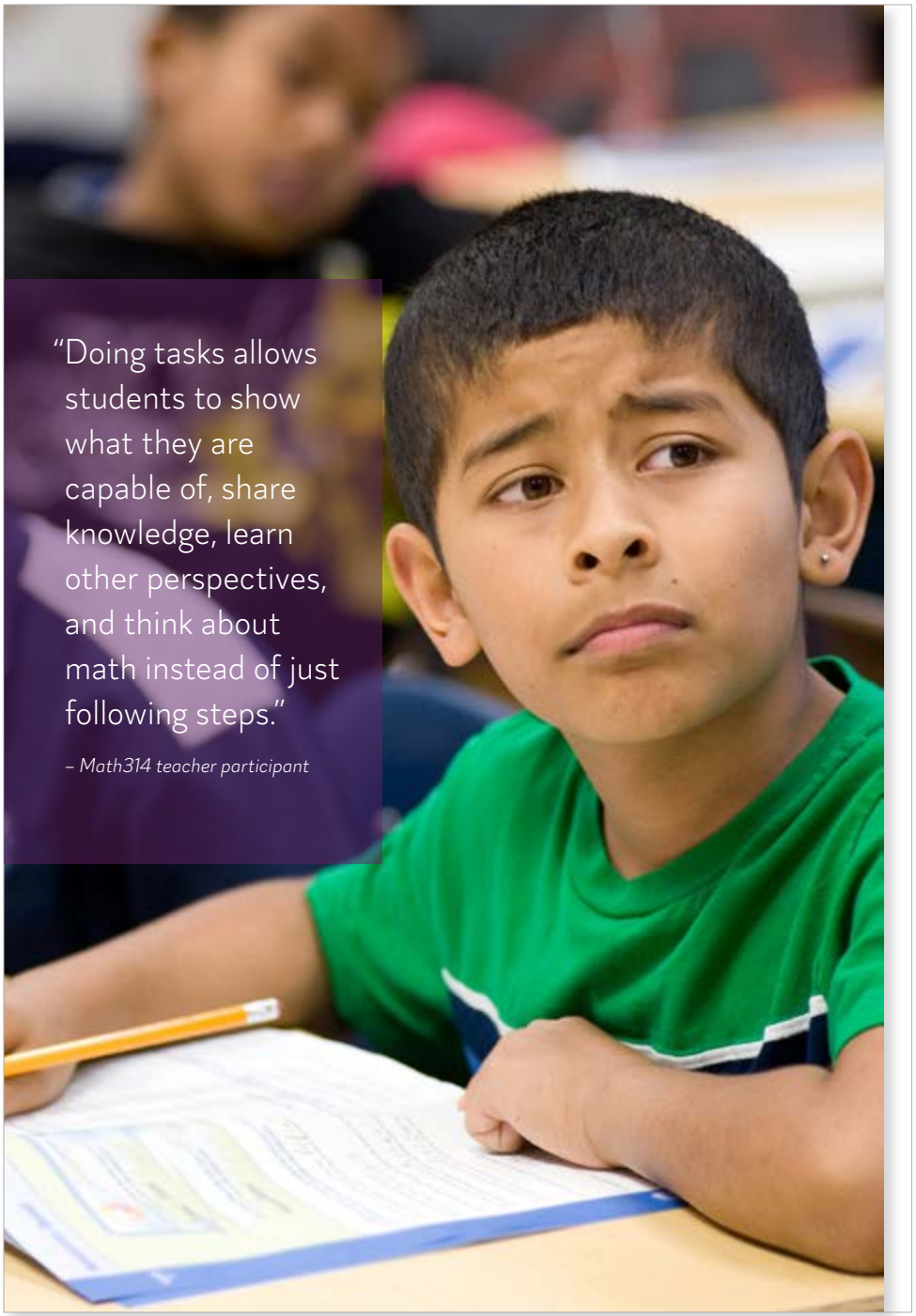
We know that mathematical achievement in a student's K-12 journey is critical for success in post-secondary and career endeavors.

- Mathematics has been called the language of STEM. A strong understanding of mathematics embeds 21st century knowledge and skills that prepare students for careers in STEM fields.[1]
- Math competency early in a student's academic career is the "greatest predictor" of future academic and career success, greater than gender or race.[2]
- Algebra is the foundation for students' future success in STEM courses. Algebra 1 is the gatekeeper course, meaning students need to complete Algebra 1 in order to take higher level courses. Completing algebra before tenth grade provides opportunities for students to take upper level STEM and AP courses in high school.[1]
- Students improve their likelihood of earning a two or four year college degree by 10 to 20 percent if they take high school math through precalculus and calculus.[3]
- In a longitudinal study that followed 13,000 students in an urban district, 81% of those who failed a math course in sixth grade failed to graduate high school.[4]
- One study suggests that ninth-grade math achievement is a "critical filter" for students' career goals, and that taking advanced math courses in high school greatly improves college and career outcomes.[4]

"The purpose of computation is insight, not numbers."

– Richard Hamming, 20th century American mathematician

[1] www2.ed.gov/datastory/stem/algebra/index.html#data-story-title
[2] grandchallenges.100kin10.org/assets/images/100Kin10-Doing-The-Math-Report.pdf
[3] Klepfer,K, & Hull, J. (2012) *High school rigor and good advice: Setting up students to succeed.* Alexander, VA: The Center for Public Education.
[4] www.renaissance.com/2018/03/22/blog-math-milestones-critical-role-math-achievement-student-success/



"Doing tasks allows students to show what they are capable of, share knowledge, learn other perspectives, and think about math instead of just following steps."

– Math314 teacher participant

What's wrong?

Achievement: American students continue to struggle with math. While achievement data in reading and other subjects has grown, math performance remains flat or is moving in the wrong direction. According to results of the 2017 National Assessment of Educational Progress, (NAEP), only 33% of eighth-graders tested proficient in math. That is the same percentage as in 2015 and is 3% less than in 2013.

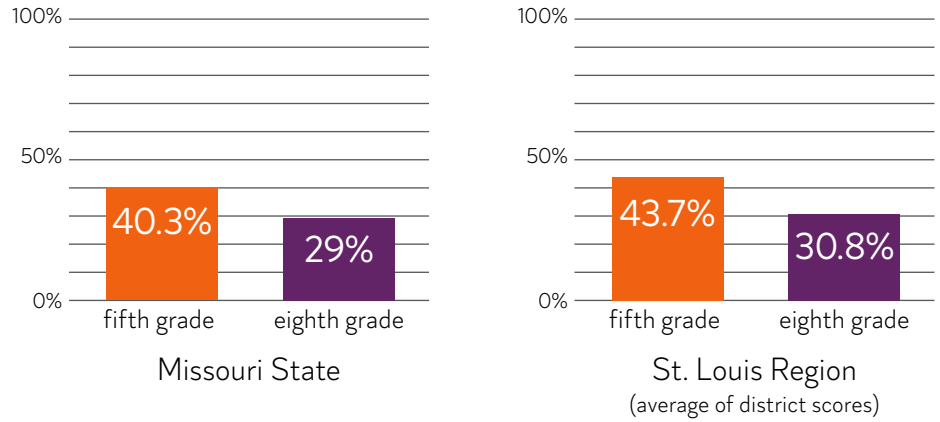
Equity: One research paper states, "It's well documented that Black and Hispanic students are underrepresented in eighth grade algebra courses. As such, access to algebra in eighth grade is a critical instance of inequality of opportunity to learn, leading some scholars to refer to it as one of the most pressing civil rights issues of our time." [5]

Pedagogy: Math314 specialists have engaged with several districts in a discovery phase of development. During this time we have listened intently to teachers. Almost unanimously they say "too much" and "not enough." The curriculum is too much to teach. There are too many strategies to cover. There is not enough time to get through the Missouri Learning Standards. There is not enough time for students to master content with understanding.

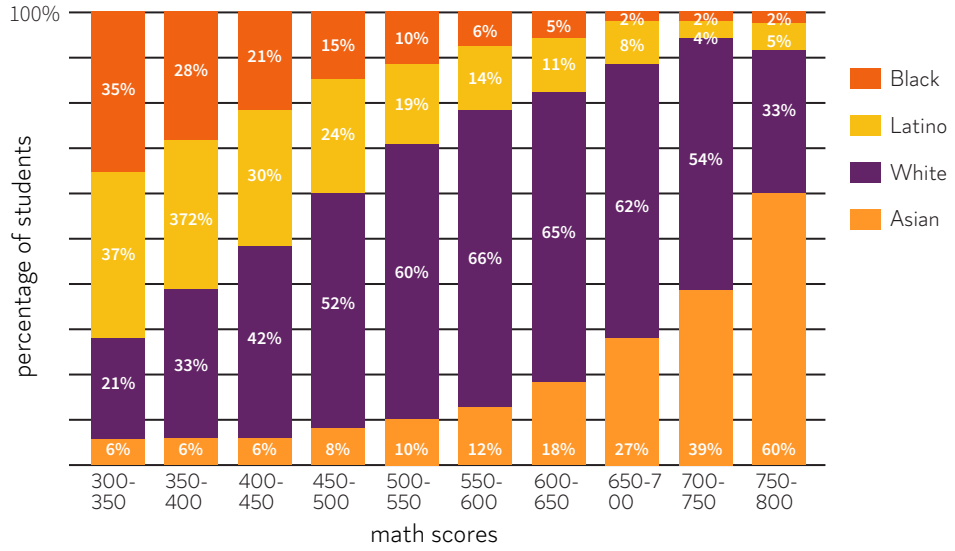
Most teachers are eager to find a better way and escape the frustration inherent in pedagogy mired in "too much" and "not enough."

[5] Morton, Rigele-Crumb. *Who Gets In? Examining Inequality in Eighth Grade Algebra*, Journal for Research and Mathematics Education 2019, Vol. 50, No. 5, 529-530

MAP Math Scores 2019
percentage of students scoring proficient or advanced



Race Gaps in SAT Math Scores



Source: College Board, SAT Math Percentile Ranks for 2015 College-Bound Seniors

Math314

We believe these things

- Rigorous math instruction is accessible by everyone
- Inquiry and risk-taking should drive the learning of new content in the math classroom
- Math classrooms should foster a growth mindset, encourage discourse, and value mistakes
- Connections between the five mathematical representations are key to conceptual understanding of math ideas
- Talk is essential to learning
- Educators can pursue, with equal intensity, conceptual understanding, procedural skills, and fluency

The mission of Math314

is to improve mathematics teaching and learning in our region by designing programs that develop educators who foster equitable learning environments. Math314 supports teachers in becoming learners and leaders who encourage inquiry, risk-taking, and conceptual understanding by experiencing mathematics in rich and meaningful ways.

We do these things

Math314 has identified several high-leverage instructional strategies for equipping teachers, coaches, and administrators with the knowledge and skills to create a productive learning environment.

Our professional learning strategies include:

- Assessing curriculum alignment with standards
- Determining vertical alignment of K-12 math concepts and practices
- Planning and lesson design
- Selecting and modifying cognitively demanding tasks
- Engaging students in discourse around comparison and connections through multiple solution paths
- Assessing student work to guide instruction
- Coaching to build teacher capacity

To achieve this end

- Teachers remove barriers in order to provide equitable access to math learning
- Every student is engaged in high level cognitive tasks
- Students are empowered as mathematicians
- Students are capable and confident problem solvers
- Students have procedural fluency, enabling them to apply appropriate procedures to new problems
- Teachers create an environment where students authentically share different solution pathways and engage in discourse to deepen their conceptual understanding
- Levels of proficiency on standardized tests improve over time

Math314 Programs

For questions about our programs or next steps to find out more:
schoolpartnership@wustl.edu (314) 935-6846

Math314 programs are fee for service

Professional Development Programs

Comprehensive and Customizable Multi-Year Learning Plan

Math314 will coordinate with a school partner district to customize professional learning over three years to strategically shift math instruction and provide long-term success. This plan includes the following components:

- Math instructional specialists work alongside partner school staff to support long-term implementation
- Professional development for math teachers, coaches, department chairs, and administrators in the form of full day learning
- Embedded support of the implementation of learning labs and content-focused coaching
- Support in the development of a clear vision for high quality math teaching
- Support in the successful implementation of chosen curricula
- Evaluation throughout the programming to monitor effective implementation
- Commitment to improved student outcomes

Specific Topics

These are short-term learning opportunities. Math314 specialists will work with the district to create a learning plan to systematically integrate the work into schools.

- Scope and Sequence Design
- Develop Units of Study
- Lesson Design
- Lesson Study Coaching
- Content Deep Dives
- Student Data Analysis
- Systems Design

Graduate Course Offerings

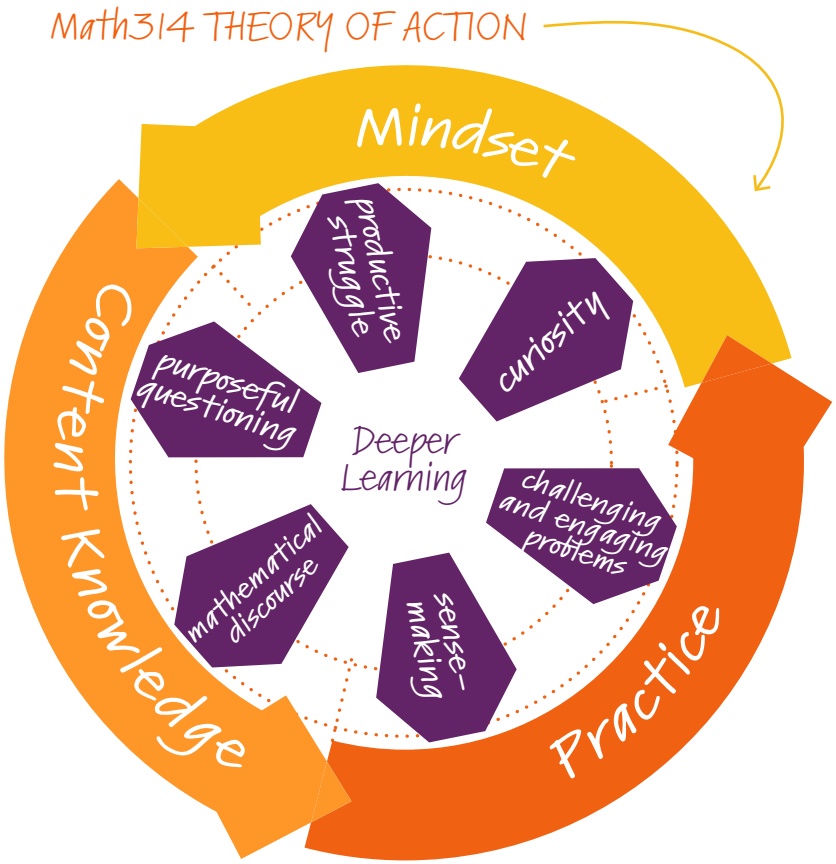
The Institute for School Partnership has made a determined decision to create sustainable career pathways for math teachers.

Certificate in Math Education

The Math314 team, with Washington University faculty, has developed coursework to offer a certificate in math education. This fifteen credit hour certificate is directed at in-service K-8 teachers and will begin enrollment in Spring 2020. It is offered through University College, Washington University's continuing education division. These courses are open to individuals or can be scheduled exclusively for a cohort of teachers from the same district.

Masters of Arts in Education: Instructional Processes

In partnership with Washington University's Department of Education and University College, we will offer in-service teachers an MAED with a specialization in mathematics instruction. This is a thirty credit hour degree and will be offered in coordination with other graduate degrees offered by the Department of Education.



Partnership with University of Pittsburgh Program

"Thinking Through A Lesson" Series

with Learning Labs, and Content Focused Coaching

The Institute for School Partnership has partnered with the University of Pittsburgh's Institute for Learning to develop this option. Math314 instructional specialists present the IFL's "Thinking Through a Lesson" series with learning labs and content-focused coaching. This plan consists of a minimum of five professional learning days and three learning labs each year.

Participants will be introduced to the selecting, sequencing, implementation, and maintenance of high level tasks, Accountable Talk™ moves, and supporting productive struggle.

The Institute for School Partnership Programs

Why Us?

The ISP Advantage

PARTNERSHIP

Partnership is in our name. ISP programs are founded on a promise of collaborative planning and customizing the plan to meet district needs.

EQUITY

We believe that the primary driver for enabling ALL students to achieve in mathematics is improved instruction.

EXPERTISE

Our Math 314 instructional experts have a wealth of experience in K-12 instruction and professional development. In addition, we have formed partnerships with University of Pittsburgh IFL, Carnegie Science of Improvement, and Washington University mathematics faculty to add deep experience and content expertise to our team.

EXPERIENCE

The ISP has 30 years experience developing high leverage teaching practices, using formative data and inquiry to adapt instruction and support learning.

LOCAL

We are local, which provides opportunity for long-term, coherent planning and programming.

OUTCOMES ORIENTED

We care about results. Your student results become our student outcomes. We hold ourselves accountable to measuring the impact of our work together.

AFFORDABLE

We are a non-profit organization and currently have a funding stream that allows us to offer programs as a cost-share model.

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The Institute for School Partnership ISP at Washington University has developed the Math314 initiative to improve mathematics learning in our region by designing programs that produce and support equitable learning environments.

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NOTICE + WONDER

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Math314 is a project of

The Institute for School Partnership at Washington University in St. Louis

with generous support from

The James S. McDonnell Family Foundation *and* STEMpact

for information about Math314 programs: schoolpartnership.wustl.edu

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