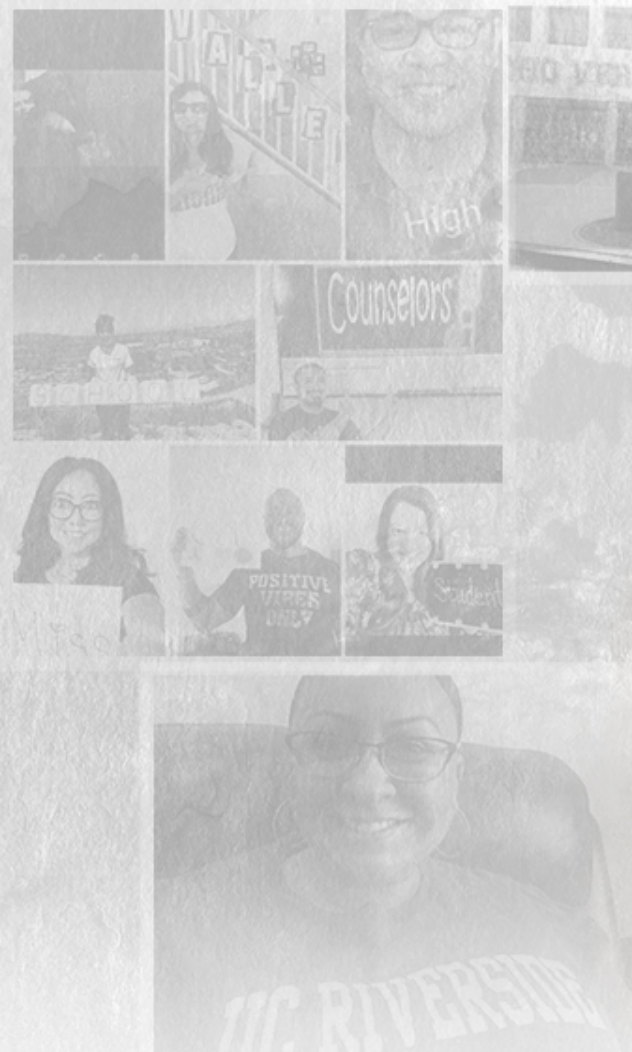


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SCHOOL COUNSELOR
LEADERSHIP NETWORK
RIVERSIDE COUNTY



i3 Mathematical Reasoning with Connections

September 29, 2020

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i3 Project Director





SCHOOL COUNSELOR
LEADERSHIP NETWORK
RIVERSIDE COUNTY



Agenda

- What is i3 MRWC
- Who is i3 MRWC For?
- Where is i3 MRWC Implemented?
- Why i3 MRWC?
 - What are Participants Saying?
 - What are the Data Saying?
- Q & A



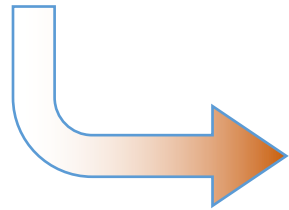
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What is i3 MRWC?

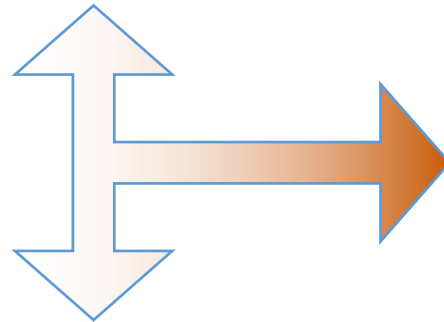
- 4th year high school math course designed to prepare students for the expectations and rigor of college mathematics course
- Reinforces and builds on mathematical topics and skills developed in IM 1-3 (or Alg I/II and Geo.)
- Advanced Mathematics course by both CSU and UC systems – fulfills “C” area for A-G admissions requirements
- Focuses on conceptual development to promote procedural fluency
- Incorporates and reinforces the SMPs in every activity
- Rigorous, challenging, and provides opportunities for productive struggle
- Focuses on conceptual development to promote procedural fluency

Mathematics isn't always easy,
but it should always make sense

Productive Struggle



Conceptual Understanding

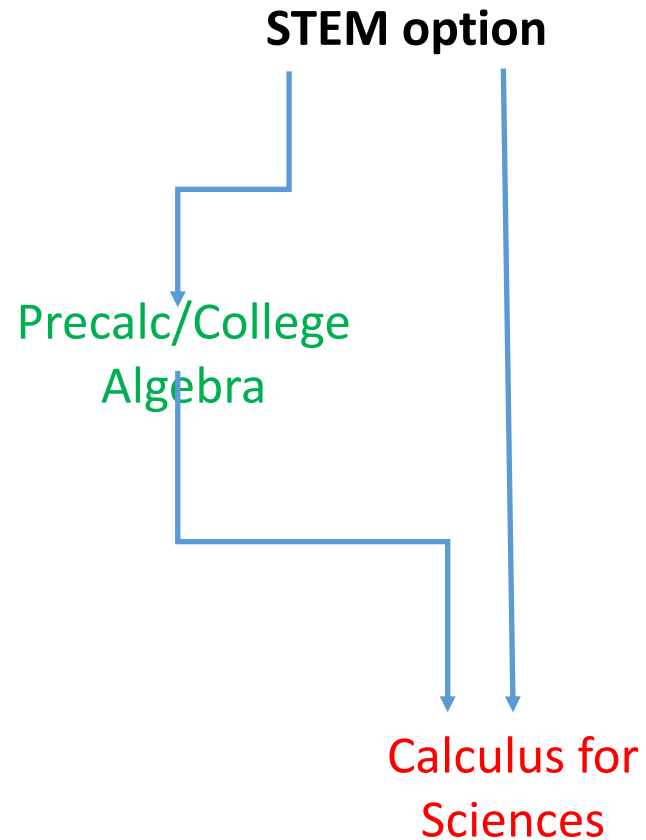


Procedural Fluency

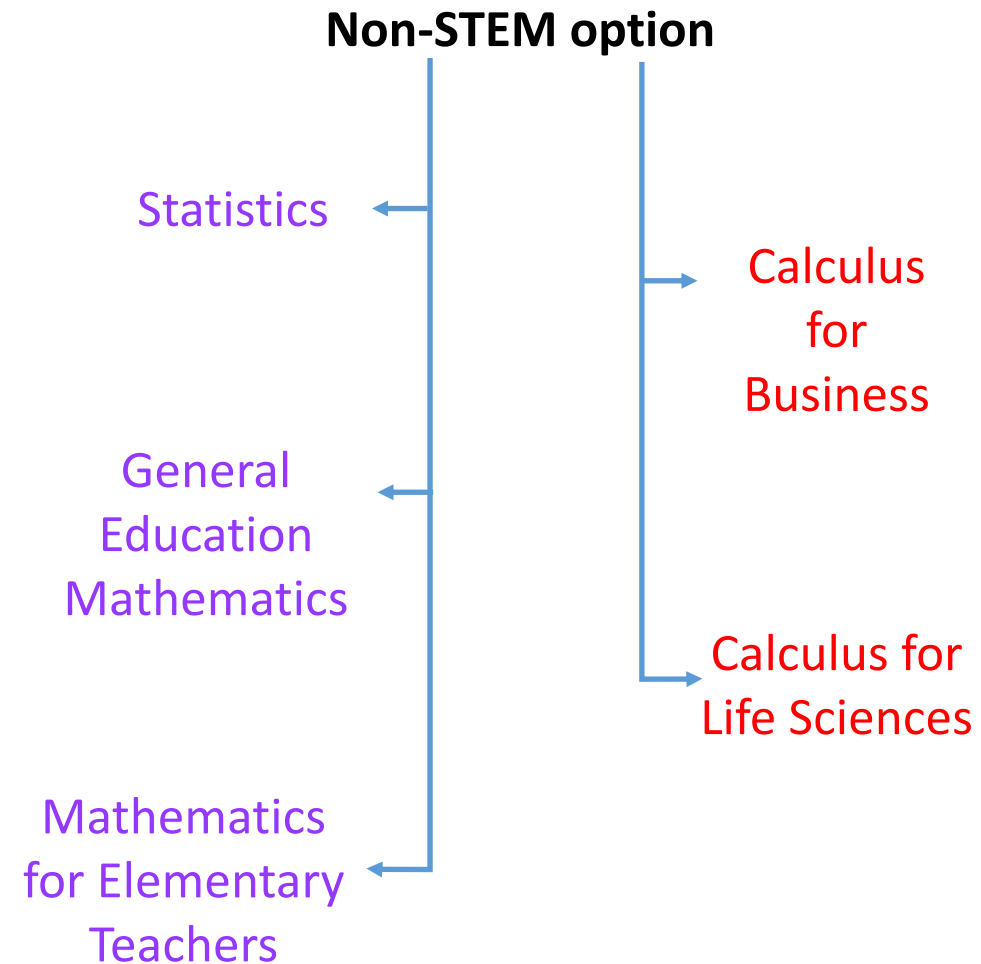
Robust Learning



Who is i3 MRWC For?



MRWC



Who is i3 MRWC For?

Prerequisites for MRWC:

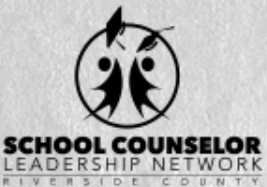
- C or better in Integrated 1-3 (or Algebra 1-2 and Geometry)

When SBAC/EAP Scores are Available

- SBAC = 2
- EAP Conditional SBAC = 3
- EAP Ready SBAC = 4 to help build a stronger foundation

Not Recommended for MRWC:

- D or lower in Integrated 1-3 (or Algebra 1-2 and Geometry)
- SBAC = 1



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Why CAASPP 2 or Above?

Placement Data	MRWC C or Higher	MRWC D or C-
1st semester lower than a C	46.80%	
1st semester C or higher	76.60%	
2nd semester lower than a C	58.30%	
2nd semester C or higher	79.10%	
CAASPP 1	54.8 %	89.7%
CAASPP 2, 3, 4	78.70%	95.2%

Where is i3 MRWC Implemented?

- i3 Funded Implementation
 - Between 2017-18 and 2019-20 school years, a total of 81 teachers in 52 high schools have been training and over 6,000 students served in the Inland Empire Region.
 - Twenty-nine teachers began their training in March 2020 for the 2020-21 school year.
- Other Counties
 - Los Angeles
 - Long Beach
 - Madera
 - Santa Clara

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Why i3 MRWC?

- Recommended by the CSU Chancellor's Office
- Approved by UC/CSU
- Approved by ASU, U of Arizona, and Northern Arizona University
- Rigorous, challenging, and helps students develop key habits of mind postsecondary faculty and employers are looking for
- Participants feedback is positive
 - What students are saying
 - What teachers are saying
 - What postsecondary faculty are saying
 - What the data are saying

CSU Chancellor's Office

CSU Chancellor's Office highly recommends Seniors take a 4th year math course in 2020-21, specifically naming MRWC as an option:

- *The CSU strongly recommends that ALL students enroll in a yearlong senior-year English course and a mathematics/quantitative reasoning course as student-specific Early Assessment Program (EAP) guidance will largely not be available at the time of senior year course registration. These courses could include Expository Reading and Writing (ERWC), Math Reasoning with Connections (MRWC), weighted honors, International Baccalaureate (IB), and Advanced Placement (AP) and other advanced courses*

What Students are Saying

- *This class helped me a lot with SATs, and I'm gonna be honest, I was like looking at problems, I was like, Oh, MRWC, but I did in a different way and I got the answer. And like if I was in algebra two, last year, I took my SATs, I had no idea what I was doing. So it's like a deeper meaning and deeper understanding of what you're asking now*
- *So high school is what kind of ruined math to me. But if I'm being like, completely honest, this year was probably like my best math that I had. And I can say that with like, total, like, no filters, no, nothing applied. Like, I really, really liked this course*
- *... it challenged me in a good way. It made me think of math in a different way, it made me view math, as something that is helpful, and that going into college, I'm going to be successful using like using this class and figuring out how everything else comes together*
- *I still don't like math, but I feel like I have a better understand [sic] and I know more than I would if I hadn't taken the class*
- *Like, I took honors math classes in previous years. And like it was just one way. And if you didn't do it that way, then it's wrong. And I just felt like, stupid, because I could never like, figure out why. But now I kind of can. I don't feel as dumb*

Student Quotes Cont.

- *I just feel like we, in here, you're more open to different ideas. Because in here, you find other ways to solve things here, you're more open to different ideas of [how] you can do it. I did it this way. But this person did it another way. But we can both agree that it's the same thing. You know, we get the same answer...as in other courses it's you guys either get the same thing or not*
- *I have never liked math. It has never been one of my favorite subjects. But after taking the MRWC course, it completely changed my thought process. Just because I feel like no matter what math I go into now in college, I'll be able to excel at it more than before. Because I always had such a negative way of thinking towards math because I was just like, I can't get this. I don't understand it. But after learning how to break down individual problems, it I believe that I'll be able to succeed much more*
- *They don't want to ask questions, because they think, Oh, they are gonna think I am stupid or something. In this class you're more like, you ask a question and everyone will be like, yah, yah. In other classes they were just like, be silent, and basically just suffer because they didn't know like what to do*

What Teachers are Saying

- MRWC pedagogical shifts are transferring to other classes
- MRWC Deepens Teachers' conceptual understanding of mathematical concepts
- Focus more on mathematical discussions
- Shifting to student-centered instruction
- More training please!

Teacher Quotes

- Teaching MRWC has significantly improved my teaching in other math classes in both content and lesson planning for student engagement
- It made me focus more on the connections between different concepts. I see this helping me being more effective teaching Integrated 3 next year
- My method of teaching improved allowing me the opportunity to have my students become more independent and self-sufficient in the learning process
- MRWC has impacted me ... to make more aggressive steps to becoming the facilitator of mathematical discussions rather than the deliverer of mathematical understanding
- My teaching methods in my Calculus and Math 4 are evolving much more this year comparing the past years. Because I see the benefits in students learning through explorations, collaborations, and reasoning, I started to implement many of the methods that I am learning from MRWC training sections
- I was more willing to invest the time and energy into creating hands-on experiences and problem-solving strategies
- I feel that MRWC helped me concentrate on specific areas in IM3 that I would normally not spend as much instruction time with my students. I also focused on MRWC topics in my Precalculus classes

What Postsecondary Faculty Are Saying

- *MRWC is an important class that pushes students towards the heart of mathematics. We must remember that the underlying skill that unities the various branches of mathematics is critical and abstract thinking. Indeed, a mathematics course is not simply a list of topics to be crossed off one at a time. MRWC trains students to be problem solvers with well-designed activities that promotes mathematical maturity. It provides students with a solid foundation that can easily be built upon in college. The most important piece of evidence that indicates that MRWC gets it right is this: many of our high school teachers have told me that, as they teach this course, they are reminded of the joy and excitement they felt as math majors. And joy is the heart of mathematics. – Michael Sill, Associate Professor of Mathematics, California Baptist University*
- *Succeeding at college-level mathematics requires identifying the essential interconnectedness of mathematical concepts. MRWC not only emphasizes these connections, it supports the development of critical thinking tools which allow students to exploit these connections to grasp new concepts. It is exactly the kind of class I wish my undergraduates had the opportunity to take in high school. – Scott Cramer, Mathematics Department, California State University, San Bernardino*

What Postsecondary Faculty Are Saying

- *MRWC provides students with so many of the skills and thought processes that are ideal in a student studying mathematics. I wish I had a chance to experience this class in high school! It really connects so many ideas of mathematics that they have been studying for so long and provides students opportunities to experience productive struggle and mathematical discourse in the classroom. – Elizabeth Cannis, Mathematics Department, Chaffey College*
- *As a community college professor, I have seen first-hand the push to have students learn mathematics in a collaborative and engaging classroom setting. MRWC teaches students to discover mathematical concepts through low-stakes activities done in collaborative group settings. It takes away the fear and anxiety often associated with math by treating mistakes as opportunities to learn, allowing for discussion, and celebrating discovery. Students learn to be independent thinkers, innovators, and team players. These are skills that will prepare students for success in their postsecondary education. Students will greatly benefit from the experience of learning in a MRWC classroom. – Michelle Black, Mathematics Department, Riverside City College*

2018-19 EOY Assessment Results



The MRWC group had an average score of 31.5% correct



Comparison students (Calculus removed) scored 24.5% correct



To determine if MRWC student performance was significantly different, an independent samples t-test was performed.



The t-test was associated with a statistically significant effect size, $t(2,672)=7.545$, $p=0.000$

Pre/Post Perception Survey Data



The MRWC and Calculus students increased in their overall attitude towards Math, while comparison students decreased



All student increased in their perception of being prepared for college level Math, with MRWC and Calculus seeing a greater increase



MRWC and Calculus saw a greater increase in the percentage of students wanting to take future Math courses



2019-20 post survey showed that 61.2% of MRWC students vs 55.9% of Target students believe they are prepared for a college-level Math course

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Thank you!

For further questions/information please contact:

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