Mathematics in Vermont

The newsletter for Vermont's Mathematics Educators and supporters

VERMONT AGENCY OF EDUCATION

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In this issue:

The ways you can access this newsletter:

- Request subscription by emailing Ryan Parkman; your name will be added to a listserv;
- The AOE *Weekly Field Memo* when issues are published; and
- AOE Website: The Mathematics Content page.

Summertime

As another year is coming to an end, it is time to both recharge our batteries, and also to prepare for next year. In this newsletter you will find information on teaching mathematics in a culturally responsive manner, understanding assessment literacy, what the SBAC actually assesses, and this year's finalists for the Presidential Awards in Engineering, Mathematics, Science, and Technology, Lynn Marie Kayhart and Lara White. I hope that you find this information informative and can use it to inform future instruction. Have a great summer!

Mathematics: The "Universal" Language

Bob Moses, the founder of the Algebra Project, states that "in today's world, economic access and full citizenship depend crucially on mathematics and scientific literacy." Mathematics is often referred to as a "universal language." However, it cannot be universal when it is presented from a single cultural perspective. To be truly universal, educators must understand that students come with different cultural backgrounds and enter the teaching and learning process with their own cultural thinking and processing styles when doing mathematics.

Mathematics has been called a "universal language" that is devoid of a particular culture, however, when mathematics is taught from the perspective of the dominant culture many other cultures suffer. This paper presents research that shows positive gains in mathematics proficiency among marginalized populations when they are taught through the cultural lens that they bring to the learning environment. To identify empowering practices that support the teaching of mathematics in a culturally responsive manner, visit How Do I Teach Mathematics in a Culturally Responsive Way.

Assessment Literacy

Data literacy and assessment literacy are both important for teaching and learning. Assessment literacy is one component of data literacy. It is essential in our understanding of what and why we are assessing and what insights we hope to gain to improve instruction. Assessments are used to measure the impact of our practices, to support equitable educational opportunities, to make valid comparisons between student groups, and to support the overall teaching and learning process. Students have an important role in data literacy as well; they need to understand that any assessment is a measure of where they are at a specific moment in time and that their results will be used tailor and improve their own personal instruction. In order to

effectively utilize the information gathered from assessments, districts must employ a comprehensive and balanced assessment system, one that is aligned to common learning expectations, uses the assessment data for its intended purpose, and creates conditions for the effective delivery of assessment practices. All assessments should consider the following:

- The alignment to common learning expectations.
- The purpose of the assessment.
- The conditions necessary for the effective administration of the assessment.

Remember, assessment literacy is just one component of data literacy. Schools, districts, and supervisory unions collect various kinds of data, of which assessment data is an integral part. Data use and literacy are foundational to the overall continuous improvement process and the more literate we are regarding all data collected, the better our improvement efforts will be. For more information, see Strengthening Local Assessment Systems for Personalized, Proficiency-Based Education: Strategies and Tools for Professional Learning, a report that describes the Vermont Agency of Education's convenings to support schools, districts, and other education organizations seeking to create high-quality local comprehensive systems of assessments.

What Does the SBAC Assess?

The Smarter Balanced Assessment Consortium (SBAC) has "test blueprints" for each of their summative assessments that outline the standard clusters that are assessed on each grade level test. Standard clusters are synonymous with the performance indicators listed in the VT AOE Sample Graduation Proficiency documents.

Those Graduation Proficiency documents also provide the elementary and middle school level performance indicators for each of the Graduation Proficiencies in a particular content area: they are not just intended for use at the high school level and are often referred to as critical proficiencies at those levels.

A school can look at their curriculum for each content area, Math and ELA, that are aligned to the Common Core State Standards (CCSS) and perform a crosswalk with the performance indicators/standard clusters that they have indicated as their critical proficiencies and/or graduation proficiencies. A school is not expected to formally assess every single standard in the CCSS, that is why organizations, such as Student Achievement Partners, have created planning tools to help highlight the major areas of focus that students should have learned at a proficient level in order to be successful in future learning. Those focus areas can be used to help schools refine their critical proficiencies and/or graduation proficiencies. The performance indicators chosen will be formally assessed to determine whether a student has met proficiency in a subject area.

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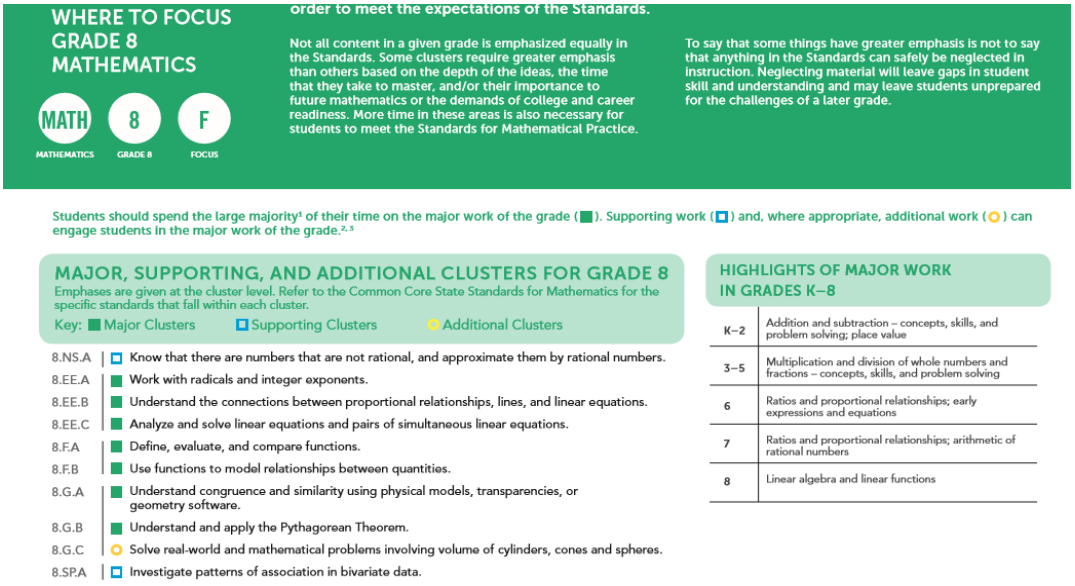
For example, here is a screenshot of the focus areas for 8th grade mathematics as prescribed by Student Achievement Partners (aka Achieve the Core):



WHERE TO FOCUS GRADE 8 MATHEMATICS

MATH (MATHEMATICS) 8 (GRADE 8) F (FOCUS)

order to meet the expectations of the Standards.

Not all content in a given grade is emphasized equally in the Standards. Some clusters require greater emphasis than others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. More time in these areas is also necessary for students to meet the Standards for Mathematical Practice.

To say that some things have greater emphasis is not to say that anything in the Standards can safely be neglected in instruction. Neglecting material will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade.

Students should spend the large majority[1] of their time on the major work of the grade (■). Supporting work (□) and, where appropriate, additional work (○) can engage students in the major work of the grade.[2, 3]

MAJOR, SUPPORTING, AND ADDITIONAL CLUSTERS FOR GRADE 8

Emphases are given at the cluster level. Refer to the Common Core State Standards for Mathematics for the specific standards that fall within each cluster.

Key: ■ Major Clusters □ Supporting Clusters ○ Additional Clusters

8.NS.A	□	Know that there are numbers that are not rational, and approximate them by rational numbers.
8.EE.A	■	Work with radicals and integer exponents.
8.EE.B	■	Understand the connections between proportional relationships, lines, and linear equations.
8.EE.C	■	Analyze and solve linear equations and pairs of simultaneous linear equations.
8.F.A	■	Define, evaluate, and compare functions.
8.F.B	■	Use functions to model relationships between quantities.
8.G.A	■	Understand congruence and similarity using physical models, transparencies, or geometry software.
8.G.B	■	Understand and apply the Pythagorean Theorem.
8.G.C	○	Solve real-world and mathematical problems involving volume of cylinders, cones and spheres.
8.SP.A	□	Investigate patterns of association in bivariate data.

HIGHLIGHTS OF MAJOR WORK IN GRADES K–8

K–2	Addition and subtraction – concepts, skills, and problem solving; place value
3–5	Multiplication and division of whole numbers and fractions – concepts, skills, and problem solving
6	Ratios and proportional relationships; early expressions and equations
7	Ratios and proportional relationships; arithmetic of rational numbers
8	Linear algebra and linear functions

When you compare the focus areas listed in the Achieve the Core document above with the SBAC Test Blueprint for 8th Grade Mathematics, you will see that each of the focus areas is also listed as assessment targets.

Target Sampling Mathematics Grade 8

Claim	Content Category	Assessment Targets	DOK[1,2]	Items CAT	Items PT	Total Items
1. Concepts and Procedures	Priority Cluster	C. Understand the connections between proportional relationships, lines, and linear equations.	1, 2	5-6	0	17-20
		D. Analyze and solve linear equations and pairs of simultaneous linear equations.	1, 2			
		B. Work with radicals and integer exponents.	1, 2	5-6		
		E. Define, evaluate, and compare functions.	1, 2			
		G. Understand congruence and similarity using physical models, transparencies, or geometry software.	1, 2			
		F. Use functions to model relationships between quantities.	1, 2	2-3		
		H. Understand and apply the Pythagorean Theorem.	1, 2			
	Supporting Cluster	A. Know that there are numbers that are not rational, and approximate them by rational numbers.	1, 2	4-5		
		I. Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.	1, 2			
		J. Investigate patterns of association in bivariate data.	1, 2			

The question that needs to be asked is, "does our school's curriculum emphasize those standards that are deemed foundational to ensure building conceptual understanding?"

So, in theory, if a school has prioritized their curriculum such that their critical proficiencies and/or graduation proficiencies contain the focus areas described by Student Achievement Partners/Achieve the Core, then the SBAC is an extremely valid tool to assess/measure what their students know, understand, and can do.

While statewide results of the SBAC are not available until after the school year ends, schoolwide data is available within 1-2 weeks of completing testing. That school level data can be accessed using the Reporting feature within the Vermont Comprehensive Assessment Program Portal. For example, using the Math Summative, it is possible to see how the school as a whole, as well as individual students, performed in each of the Assessment Targets of the SBAC. That information can then be used to make instructional changes at the programmatic level and to inform intervention strategies for individual students.

Presidential Awards in Engineering, Mathematics, Science, and Technology

Congratulations are in order for both Lynn Kayhart and Lara White for being named Vermont finalists for the 2021 Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST). The PAEMST are the highest honors bestowed by the United States government specifically for K-12 science, technology, engineering, mathematics, and/or computer science teaching. The Awards were established by Congress in 1983. The President may recognize up to 108 exemplary teachers each year. The award recognizes these teachers for having both deep content knowledge of the subjects they teach and the ability to motivate and enable students to be successful.

Later this year the national awardees will be announced, and we wish both exemplary educators the best of luck. In the meantime, please read a little about these educators in the following passages.

Lynn Marie Kayhart

My name is **Lynn Marie Kayhart**. I graduated from St. Anselm College in 1995 with a Bachelor of Arts degree, with a major in Mathematics and a minor in Education. My first 5 years teaching were at Keene High School in New Hampshire. In 2000, I moved back to Vermont and have spent the past 21 years teaching at Vergennes Union High School. At VUHS, I have taught Integrated I-IV, Pre-Calculus, AP Statistics, and AP Calculus. In 2009, I earned my Master of Education through the Vt. Mathematics Initiative Program at UVM.

Throughout the last 21 years at Vergennes Union High School, I have served as the Math Team Coach & Advisor of the National Honor Society. I have mentored over a dozen new teachers at VUHS and six math interns. I have served on many committees including the Leadership Council. I create an environment to allow access and engagement to learning for all students. I want them to be good citizens as well as good mathematicians and reach their life goals. I'm most thankful for the amazing students that I have had the privilege of teaching over the past 26 years. I'm proud that my students have become business owners, doctors, nurses, lawyers, mechanics, teachers, caregivers, engineers, parents, and genuinely good people. This is why I teach.

In my free time, I enjoy spending time with my husband Chris, my daughter Reagan who will be a freshman at WPI next year and my son Parker who is a sophomore at Vergennes Union High School. I am honored and humbled that I have been selected for this award. Thank you!

Lara White

My students ask me, "Have you always liked math this much?" Well, I got my first chalkboard when I was in the third grade; I used it exclusively to write out number patterns, combinations, and permutations.

For almost twenty years, I have been teaching math and science to grades seven through twelve, always in rural schools, always in Vermont. This is my fourth year back at Lyndon Town, where I started my teaching career in 2002. I love my job. I am also the Co-President of the Vermont Council of Teachers of Mathematics. My husband and I have a blended family with six children and three grandchildren.

I keep busy. Given the forum, I want to say that this year has been difficult. We sat far apart at separate desks. We have sanitized and had our temperatures taken and have signed in and out of everywhere. Even recess was different. My students had to adjust and readjust and readjust again. Through all of it though, they continued to laugh and joke, tell me their stories, and make connections. They were still quite social, even while at a distance. They found new ways to work together, solve challenging problems, and inspire me. They were still my students, just different. I will be forever grateful.

Always look for what is going right. This year allowed me to build better whole group discussions. It taught me to ask different questions. It required me to use technology in new ways. It gifted me access to professional learning through zoom, for free. Whatever it is that we face, let's face it head-on. Continue to be ourselves, just different.

And as I overheard one student say to another, "You should ALWAYS have a Desmos tab open." Enough said.

Events, Announcements, and Resources

Please check the AOE website frequently for upcoming events, announcements, and resources. A Weekly Field Memo is published every Wednesday and contains time-sensitive and relevant information designed for students, teachers, and staff. The agency encourages principals, headmasters, and superintendents to share the memo with their education community. Additionally, individuals can subscribe or unsubscribe online.

Directions for Submissions

If you would like to submit an article, announcement, event, or resource for a future newsletter, please email information to ryan.parkman@vermont.gov. This newsletter will be published four times throughout the school year. Time sensitive materials will be prioritized, be sure to check if the dates of publication will delay the sharing of information.

To subscribe or unsubscribe to the Mathematics in Vermont e-bulletin, write to ryan.parkman@vermont.gov or call (802) 828-6468.

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