



Lincoln Public Schools

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Assistant Superintendent of Schools

To: School Committee
From: Mary Sterling, Assistant Superintendent
Re: Update on Mathematics Assessment and Curriculum Alignment
Date: May 16, 2014

This memo provides a progress report on a significant priority in the strategic plan under Curriculum and Instruction: Continue refining curriculum to align with new MA curriculum frameworks in mathematics (B3). First, the math specialists and administrators have worked to completely revise the Lincoln Learning Expectations in mathematics and the standards-based report cards, so that they both now reflect the new mathematics framework. Our mathematics curricula, too, has required comprehensive review and adjustments at all grade levels so that our students' learning is anchored in the new state standards. In addition, we have worked to refine our approach to assessment in mathematics so that our assessments are aligned to standards and are valuable for student growth. I will summarize the key efforts to date, describe current steps and suggest future considerations to ensure excellence in our mathematics programs for all students.

Curriculum

Math specialists, with the leadership of Kathy O'Connell and Ellen Metzger, have worked for the past two years to align our elementary program, *Everyday Math*, and our middle school program, *Impact Mathematics*, to the new state standards. They have examined each unit at all grade levels, compared them to new standards, and determined whether lessons are still relevant, need adjustment, or need to be omitted. In addition they have highlighted areas where supplementary materials are needed to add depth. They have researched possibilities for supplementary materials and tried out samples. We have now purchased supplementary and replacement units at appropriate grade levels. Inevitably, as a result of curriculum adjustment, the unit assessments have needed revision as well.

At every grade, there is now an alignment overview and specific guidance for each unit located on Google Drive for teachers to access. Math specialists have provided teachers with professional development regarding revised and new materials through common planning time and specially designated release time. Teachers are now expected to plan lessons by referencing both their teacher's program guide and the digital resources. This work has been time-consuming and has involved much collaboration between the specialists and input from the teachers at every grade level. Although there has been much progress in this alignment process, we are not finished. Time is needed this spring and summer to complete the major reshaping and alignment of curriculum at each grade level. Given this new foundation of curriculum, in the next few years the focus should be on the instructional approaches that use the re-aligned curriculum and assessments to strengthen student learning.

Assessment

The development of approaches in assessment of mathematics learning has been a focus for the district over the last three years. Math specialists have worked with teachers at each grade level to align unit assessments to the new standards. Teachers keep their own records of student progress on unit assessments, which provide important data points in our standards-based reporting system. At one time, we used program assessments at midyear and end-of-year as common assessments. However we have now made those assessments optional for teachers as we turn our focus to piloting district Growth Measures (DDM) for meaningful common assessments.

Open Response questions are important in mathematics learning for many reasons: learning to read and understand mathematical situations, plan and find solutions, and write justifications an explanation of mathematical thinking. Although this type of question appears in our regular math programs, there are not enough of them and some of them do not require enough high-level thinking and cognitive

demand. Students need more coaching and practice with this type of problem solving, reasoning and communicating.

Over the past three years, math specialists have worked to create a set of Open Response questions in math for grades 1-8 to be used both as teaching tools and as common assessments across the district. The math specialists have purposely selected questions that are connected to the "critical areas" of the new mathematics state frameworks. A schedule of these common assessment questions at each grade level has been developed and Rob Ford has developed recording sheets for use by teachers (See chart below of questions for grades 1-5.) Math specialists have used faculty meetings and common planning time to work with teachers on these questions, the collaborative scoring procedures, and the recording forms. This initiative has been a significant effort and much progress has been made, but we are not finished. Teachers need more time and coaching to make these problem-solving questions an integral part of their instruction, to analyze the results in order to inform their instruction, and to give specific feedback to students for improvement.

As a district, we have been trying to develop or locate district math assessments that would provide data about student achievement at each grade so that we could diagnose student needs and monitor progress over multiple years. Early attempts to use assessments associated with our two math programs were not successful. This year, we have selected and piloted online assessments. Our pilot was completed on April 4. This month, we are reviewing feedback from the pilot, consulting with principals, and making recommendations for the coming year.

Current Steps and Future Considerations

During the month of March, math specialists held meetings with each building principal to discuss the progress and status of math curriculum development and use of assessments. The intent of these meetings was to make sure principals were fully informed about all the work that has been underway these past two years and to discuss concerns and perspectives. Also under discussion was the time needed to: 1) continue the curriculum alignment in order to support teachers, 2) provide timely professional development, 3) structure collaborative scoring of student work, facilitated by math specialists, and 4) move forward about decisions regarding the use of online learning and assessment resources. Principals were appreciative of the math specialists' efforts to revise curriculum and assessments, and shared concerns and ideas about providing time and structure for the ongoing work. We have strong consensus about what is important to address in the continued development of a high quality mathematics program for all students. Yet this work demands further conversation and decision-making, with regards to time, resources and other district priorities for the coming school year.

District Mathematics Open Response Schedule 2013-2014 Grades 1-5

Kinder- garten	District OR's need to be revised due to purchase of new Investigations materials					
First Grade	<p>Baseline #1 <i>Ten Toys</i></p> <p><u>Timeline</u> – End Unit 1, End of September</p> <p><u>Content</u> – “How many of each” problem. Combinations of 10.</p>	<p>Instructional #1 <i>Apples, Apples</i></p> <p><u>Timeline</u> – End Unit 2, End of October, early November</p> <p><u>Content</u> – Addition, Put Together 1 and 2-digit number</p>	<p>Progress #1 <i>Pennies in My Pocket</i></p> <p><u>Timeline</u> – End Unit 4, Mid December</p> <p><u>Content</u> - Add/Subt., two 2-digit numbers</p>	<p>Baseline #2 <i>How Many Steps?</i></p> <p><u>Timeline</u> – End Unit 5, Late January</p> <p><u>Content</u> – Add/Subt., linear representation</p>	<p>Instructional #2 <i>Many Crayons</i></p> <p><u>Timeline</u> – End Unit 6, Early March</p> <p><u>Content</u> – Add/Subt. Both addends unknown</p>	<p>Progress #2 <i>Counting Books</i></p> <p><u>Timeline</u> – End Unit 9, Late May</p> <p><u>Content</u> – Add/Subt. Comparison</p>
Second Grade	<p>Baseline #1 <i>The Lunchroom</i></p> <p><u>Timeline</u> – End Unit 1 End of September</p> <p><u>Content</u> – Addition, two 2-digit numbers</p>	<p>Instructional #1 <i>Penguin Heights</i></p> <p><u>Timeline</u> – End Unit 2, End October, early Nov.</p> <p><u>Content</u> – Add/Subt., comparison problem</p>	<p>Progress #1 <i>Birthday Money</i></p> <p><u>Timeline</u> – End Unit 4, Mid December</p> <p><u>Content</u> – Add/Subt. 2 step problem</p>	<p>Baseline #2 <i>Recess</i></p> <p><u>Timeline</u> – End Unit 5, Late January</p> <p><u>Content</u> – 2-digit subtraction, change unknown</p>	<p>Instructional #2 <i>Stuffed Animals</i></p> <p><u>Timeline</u> – End Unit 6, Early March</p> <p><u>Content</u> – Subtraction, 2 digit, result unknown, 2-step problem</p>	<p>Progress #2 <i>Hundred Stories</i></p> <p><u>Timeline</u> – End Unit 9, Late May</p> <p><u>Content</u> – Add/subt. from 100, result known, multi-step</p>
Third Grade	<p>Baseline #1 <i>Peter's Parade Day</i></p> <p><u>Timeline</u> – End Unit 1, End of September</p> <p><u>Content</u> – Add, 2-step word problem</p>	<p>Instructional #1 <i>New Bike for School</i></p> <p><u>Timeline</u> – End Unit 2, End of October, early November</p> <p><u>Content</u> – Add/subt. Within 1000, 2-step word problem</p>	<p>Progress #1 <i>At the Corner Store</i></p> <p><u>Timeline</u> – End Unit 4, Mid December</p> <p><u>Content</u> – Add/subt. Within 1000, 2-step word problem</p>	<p>Baseline #2 <i>Wheels and More Wheels</i></p> <p><u>Timeline</u> – End Unit 6, Late January</p> <p><u>Content</u> – Mult., equal groups, 2-step word problem, representation using equations with unknown</p>	<p>Instructional #2 <i>Jump Ropes</i></p> <p><u>Timeline</u> – End Unit 7, Early March</p> <p><u>Content</u> – Mult., equal groups, linear meas. problem, 2-step word problem, representation using equations with unknown</p>	<p>Progress #2 <i>Elizabeth's Cookies</i></p> <p><u>Timeline</u> – End Unit 9, Late May</p> <p><u>Content</u> – Mult., array model, 2-step word problem, representation using equations with unknown</p>

Fourth Grade	Instructional #1 <i>Triangles</i> <u>Timeline</u> – Beginning Unit 1 Mid September <u>Content</u> – Geometry, identifying properties of shapes	Progress #1 <i>Jason’s Shapes</i> <u>Timeline</u> – End Unit 1 Begin October <u>Content</u> – Geometry, identifying and composing 2D shapes	Instructional #2 <i>All Those Chairs</i> <u>Timeline</u> – End Unit 3 Late November <u>Content</u> – Multiplication	Progress #2 <i>On a Trip</i> <u>Timeline</u> – End Unit 5 January <u>Content</u> – Multiplication and division	Instructional #3 <i>Chet’s Rectangles</i> <u>Timeline</u> – End Unit 7 March <u>Content</u> – Fractions of area	Progress #3 <i>Mrs. A’s Floor</i> <u>Timeline</u> – End Unit 9 June <u>Content</u> – Fractions of area
Fifth Grade	Instructional #1 <i>Harrison’s Cookies</i> <u>Timeline</u> – End Unit 1 End September <u>Content</u> – Multiplication – 2 digit x 2 digit	Progress #1 <i>Science Class Review</i> <u>Timeline</u> – End Unit 2 Mid-end October <u>Content</u> – Multiplication – 2 digit x 2 digit	Instructional #2 <i>Auditorium</i> <u>Timeline</u> – End Unit 7 Mid March <u>Content</u> – Operations with Fractions	Progress #2 <i>Soups</i> <u>Timeline</u> – End Unit 8 End of March <u>Content</u> – Operations with Fractions	Instructional #3 <i>How Many Cubes</i> <u>Timeline</u> – Beginning Unit 9 Mid May <u>Content</u> – Volume	Progress #3 <i>Cari’s Aquarium Designs</i> <u>Timeline</u> – End Unit 9 Early June <u>Content</u> – Volume

Baseline Questions

These questions are administered to students with little support or guidance. The data is used to determine where students are in both the problem solving and communication. Teachers are then able to form groups and target instruction around problem solving and communication.

Instructional Questions

These questions are designed as a “teaching tool”. Teachers may use them in small groups to further students understanding of both problem solving and communication. Teachers may support students in their answers and work with students to develop solid answer.

Progress Questions (shaded yellow; will be scored collaboratively and reported to the district.)

These questions are administered to students with no support. They are commonly scored and scores are submitted and kept by the district. We do look to these scores to see growth in the area of communication, however, it is difficult to follow content as in the upper grades the math content of the questions does not progress but is tied to different Standards.