

# Lincoln Public Schools

## K-8 Math Guide

<b>Purpose and How to Use this Guide</b>	<b>1</b>
<b>Beliefs and Values</b>	<b>2</b>
<b>Using a Purchased Curriculum Well</b>	<b>3</b>
<b>Prioritized Standards and Curriculum Pacing</b>	<b>5</b>
<b>Assessments</b>	<b>8</b>
<b>Looking at and Using Student Learning Data</b>	<b>10</b>
<b>Math Specialist Team</b>	<b>11</b>
<b>Other Important Resources</b>	<b>12</b>

## Purpose and How to Use this Guide

In our district it is not uncommon for faculty to shift grades and each year we always have at least one new teacher who will teach math K-8. Over the years, math specialists have worked with individual teachers and grade levels to pace curriculum and include external resources that we think are strong. But, this has led to lots of helpful documents saved in lots of places, or buried in emails; and some of the guidance has felt mandatory to some and optional to others. In addition, during the first phase of the pandemic we “Marie Kondo’d” our standards and curriculum since we had less time, but are ready to reintegrate some components. Naturally, teachers have asked which standards or skills should be prioritized. The math specialist team worked very hard to curate this guide to support all K-8 faculty with 4 main goals:

- **Clarity and alignment** for faculty
- **Transparency in our values and prioritization**
- **Equalizing access for all students** to important experiences or teaching practices
- Creating a **one-stop-shop** for teachers and math specialists

In order to use it well we have two important headlines to share:

- **This doc is DYNAMIC.** It’s intentionally not a PDF so that we can tweak and grow it but always have full, up-to-date access for everyone. Please “star” this document on your Drive but do not print it, since edits will be ongoing -- especially since it is not “finished!” You’ll see a number of places that still need links or updates and comments and notes from the math specialist team. Creating this (and all the conversations and decisions the team needed to make) was a massive undertaking; grades 4 and 5 especially have components that will be grown and added in the fall. The vast majority of 6-8 work will be done with the 6-8 math department in 2022-23.
- This resource is predicated on the necessity that **classroom teachers will talk with their math specialists regularly.** Teachers should use CPTs and other times to work through questions, and issues collaboratively. We expect that through working together we will adjust and grow this resource as needed.

## Beliefs and Values

After observing math classrooms K-8 across the district and engaging in lots of conversation the math specialist team articulated the following beliefs and values that we espouse for our students and classrooms. The team is eager to support teachers in making these aspirations a reality for all students.

We believe that:

- Math is more than numbers and analytic skills in linear ways
- Math is about relationships, truth, and connecting ideas
- Math is the communication of numbers, pictures, and words as they represent ideas
- Math is fun
- Math cuts across culture, language, and content areas for shared understanding
- Everyone has mathematical ideas and it is our job as educators to connect to these and grow them in our students

LPS Values in Teaching and Learning Math:

- Learning math is a social endeavor that requires consistent, daily opportunities for student discourse
- Students need to make their thinking process visual and explain their thinking through the use of manipulatives and thinking routines
- It is equally important that students are effective and efficient in their strategies while simultaneously able to articulate why they think something is true
- Students need to experience productive struggle and not be “saved” or have the thinking done for them
- Students need to have their learning framed up front as to why a topic or skill is important, relevant, and how it connects to other learning
- Students should work in partners and small groups more frequently than engage in whole-class instruction for differentiated opportunities
- Students should experience that math is all around them and part of real life, not on worksheets that can seem separate from life

## Using a Purchased Curriculum Well

There are benefits and drawbacks to using a purchased curriculum. For math in our district, a purchased curriculum gives us a skeleton for teachers to use so that they are not crafting everything from scratch, particularly for K-5 teachers who facilitate learning in all core subjects. It has been constructed by a team of skilled authors who have carefully considered the vertical learning trajectory for students.

**BUT**...with any curriculum (purchased or created) teachers constantly have to make choices about how to teach and how to engage students, especially as we work to ensure that learning is engaging, culturally responsive, and deeper for all students. AIDE was consistently at the center of math specialist conversations when making this guide, particularly as we considered how to bolster consistent access to high-quality curriculum across classrooms. Deeper Learning for all does not require multi-month, transdisciplinary, highly complex tasks in which students raise chickens from eggs or lobby successfully to the senate. Deeper Learning can also occur within singular curricular areas across shorter bursts of time, when ALL students strive for and successfully develop solid and deep understanding of mathematics.

Whether you are just trying to think through how to teach one specific lesson well straight from our purchased curriculum, or trying to dream up bigger ideas, we cannot stress this enough: **talk with your math specialists**; they are eager to partner to actualize AIDE and Deeper Learning in math for all students.

While math class should look different depending on ideas being conveyed and students' needs, there are some basic components that should be in every structure. Most lessons benefit from having a mini lesson followed by small targeted groups, though there are times that are better to keep the class all together, or to split into two groups. Below are the structural components math specialists recommend and administrators expect to typically see:

Agenda	Looks like	Sounds like
Clear <b>Learning Target</b> in the opening of the lesson	Learning target is posted and is discussed briefly with students	Students actively talk about and process the Learning Target
<b>Mini-lesson</b> of about 15 minutes focused on the learning target	Students focused on the same math idea	Students actively responding to and asking questions about the concept/skill
<b>Targeted small groups</b> with tailored instruction -- all based on students next learning steps	Different types of stations are used -- for example: <ul style="list-style-type: none"> <li>● one group is with a teacher receiving explicit instruction</li> <li>● another adult reinforces a topic that's already been taught but needs practice</li> <li>● students work in groups that involve use of technology (like DreamBox), a game, fact fluency, or a set of math boxes, etc.</li> </ul> All students are deeply engaged in the work at hand	Students engage by asking each other and adults questions  Students can articulate what they're working on, why, and how it connects to the Learning Target
<b>Closing of the lesson</b>	Students are able to succinctly reflect on and summarize the <i>learning</i> they did during the lesson that helped them achieve the Learning Target	

## Prioritized Standards and Curriculum Pacing

### Standards

One trap educators can fall into when teaching math well is around standards. If teachers feel beholden to teach all standards with equal weight, then with the sheer number of standards (particularly in the upper elementary and middle school grades) results in teaching for breadth rather than depth, and a harried sense of urgency to “get through the curriculum.” It is critical for us to recognize that not all standards are equally worthy or meaningful to growing mathematical understanding at each grade level. Some skills or knowledge lend themselves to exposure in one grade level and mastery in another; some are just the first step in a sequence and others are the last stop before complexifying into something else. The math specialist team has prioritized K-8 standards clusters using a stoplight color coding of **green** (the most important); **yellow** (less important at this grade level and could just be exposure for students and will not be assessed); and **red** (least important in comparison and could be skipped in service of depth in other areas). Teachers should use this set of prioritization as a guide when making decisions that involve trade-offs for what to focus our time and attention on.

### Curriculum Pacing Guides

Another issue we have seen teachers or teams face is around pacing and the inclusion (or exclusion) of important lessons or learning opportunities. There have been times when a grade level or a single class has been four weeks behind others, leading students to miss entire units by the end of the year or preventing cross-class collaboration. We have included additional days in each unit, recognizing that some classes or whole grades might need extra time to complete a unit before moving onto the next one. These days are intended to be used based on the needs of your students and not as weekly scheduled days (as was our previous practice with Flex Days). Keeping this in mind will allow teams to stay in sync with the timeline of the pacing guide and assessment schedule while also remaining flexible to individual class needs.

Sometimes we talk about what is “loose” and what is “tight” within the district. The following chart clarifies our expectations:

<b>Tight(er)</b>	<b>Loose(er)</b>
<b>Use the standards clusters that have been prioritized</b> with particular attention to “hard stop” standards  <b>Utilize the Curriculum Pacing</b> , both in terms of	The Curriculum Pacing guide provides parameters, but within daily lessons, students’ needs should drive the teachers’ instructional choices. There will be times when students need to work on standards from previous grades

<p><b>content</b> (eliminating specific lessons, adding in external resources) as well as <b>timing/pacing</b></p>	<p>because of gaps in their knowledge or skills. Other times, students need opportunities to dig much deeper into a standard or concept because they are ready for more challenge. <b>Teachers should use additional days within each unit, sequencing learning trajectories that make the most sense for their students.</b> In all cases, we strongly encourage communication and collaboration with math specialists to make decisions.</p>
<p>These resources clarify “what” is being taught and to some extent “when.” The <b>values listed on page 2</b> are the tight component of the “how.”</p>	<p>While “how” math is taught needs to align with our values on page 2, teachers have <b>considerable latitude to plan their instruction</b> to be as engaging and successful as possible for their learners.</p>
<p><b>Using the full, updated assessments</b> and using district <b>guidance around assessment practices.</b></p> <p>Timely entering of <b>data by math specialists into shared spreadsheets</b> with quick analysis and collaborative conversations and <b>agreements about next steps for students.</b></p>	<p>Teachers can and should always utilize <b>formative assessment</b> practices tailored to their students as a part of daily teaching and learning. The district trusts teachers to craft and utilize these in the ways that most help their class.</p> <p>Assessment data often shows individual teachers or grade levels that unique paths forward need to be taken. Each teacher and grade level team will work with their math specialist and K-5 Content Specialist to <b>determine next steps for students based on assessment data.</b></p>

**Links to grade-level standards priorities and curriculum pacing guides:**

Kindergarten [Standards Prioritization](#) and [Curriculum Pacing](#)

Grade 1 [Standards Prioritization](#) and [Curriculum Pacing](#)

Grade 2 [Standards Prioritization](#) and [Curriculum Pacing](#)

Grade 3 [Standards Prioritization](#) and [Curriculum Pacing](#)

Grade 4 [Standards Prioritization](#) and [Curriculum Pacing](#)

Grade 5 [Standards Prioritization](#) and [Curriculum Pacing](#)

Grade 6 Standards Prioritization and Curriculum Pacing

Grade 7 Standards Prioritization and Curriculum Pacing

Grade 8 Standards Prioritization and Curriculum Pacing



## Assessments

The goal of an assessment is to find out what a student knows so that teachers can support their next step in learning. An assessment should not be separate from learning; rather, it is a component of the learning process. For these reasons, teachers should be intentional in how assessments are administered.

Sometimes we hear and see an internalized dichotomy from teachers: that either assessment should look like every student by themselves, hidden behind privacy folders, taking an assessment for a full lesson in silence -- or that students get significant help whenever they struggle to the point where students don't fully take the assessment independently and the data is not really a measure of what students can truly do.

We are strong proponents of the following approach and will support teachers in implementing it:

- **Use small groups and stations to complete assessments**, breaking the assessment up across one or two days (in which some students take it on one day in a station and another group takes it the next day - or halve the assessment and have kids take a part of it one day and a part the next). This lets teachers have a deep glimpse into how their students tackle problems, especially if there are specific students that a teacher particularly wants to observe and take notes on because additional information would be helpful in supporting this student's learning. In younger grades in which there are more classroom assistants, tutors, and other staff, teachers should utilize the adults highly intentionally.
- **Teachers carefully observe students as they complete the assessment, taking notes on a messy sheet and even on students assessments themselves.** [Here is the messy sheet template](#) we strongly recommend teachers use or adapt. Some teachers are hesitant to write on a student's assessment while they are taking it, but it can serve as a helpful tool for teachers and students alike. Here is an example of one. If you'd like to learn more about this approach, talk with Kathy!

### BoY and EoU Assessments

**The Beginning of Year Assessment will be given Monday-Wednesday 9/12-14.** Teachers should work with all classroom assistants, tutors, or special educators, alongside math specialists to coordinate how to effectively administer assessments in their classrooms. Math specialists will be in touch with grade 1 teachers to administer student interviews. Math specialists will score all BoY assessments. Classroom teachers should give math specialists all BoYs as soon as they are complete.

Below are links to all of the assessments (BoY and EoU) for each grade level for the year:

Assessments by Grade Level (BoY and EoU)		
Kindergarten	<a href="#">Grade 3</a>	Grade 6
<a href="#">Grade 1</a>	<a href="#">Grade 4</a>	Grade 7
<a href="#">Grade 2</a>	<a href="#">Grade 5</a>	Grade 8

### Fact Fluency

A student's fluency in basic facts is an important and necessary part of their mathematical development. Their fluency with facts should be based on taught strategies and allow for students to "build" their understanding and fluency (i.e. knowing doubles facts to support doubles +/- 1, turn-around facts etc.). Being fluent in basic facts does not mean rote memorization. We are not looking for rapid timed tests, instead, a development of understanding and automaticity with the facts over time.

The Massachusetts State Frameworks have standards in grades 1 - 4 to support student's fluency development.

- Kindergarten - fluent with addition and subtraction facts within 5
- Grade 1 - fluent with addition and subtraction within 10
- Grade 2 - sums of two single digit numbers and related differences
- Grade 3 - products of two single digit numbers and related division facts
- Grade 4 - know multiplication and related division facts through 12 x 12

To support each student's skill development in the standards, we have "targeted" certain sets of facts to units and we have developed ongoing fact fluency assessments. The assessments include a brief student interview and the accompanying recording sheets.

### Assessment Spreadsheets

Once they are ready, we will include links to grade level assessment spreadsheets here, though access will only be given to those who need it to protect student privacy.

<b>Assessment Spreadsheets by Grade Level</b>		
Kindergarten	Grade 3	Grade 6
Grade 1	Grade 4	Grade 7
Grade 2	Grade 5	Grade 8

### iReady

We will begin using iReady Math Diagnostic three times a year starting this fall. iReady is a computer-adaptive test that determines math proficiency across four domains of Number and Operations, Algebraic Thinking, Measurement and Data, and Geometry. Teachers will be trained by the math specialist team and Jess in September. Below is our assessment schedule:

	<b>K-5</b>	<b>6-8</b>
<b>Fall</b>	<b>10/3-10/7</b>	<b>9/12-9/16</b>
<b>Winter</b>	<b>1/23-1/27</b>	
<b>Spring</b>	<b>TBD based on snow days earliest: 5/22-5/26 or latest: 6/5-6/9</b>	

## Looking at and Using Student Learning Data



***UNDER CONSTRUCTION -- MORE UPDATES COMING SOON!***

- Why it is so critical to have accurate data in spreadsheets
- Our process for who grades and enters data
- How we will look at data and how we will use data (internal assessments and iReady)
  - Look at content
  - Look at individual students
  - Look at demographic groups
  - Use all of this to determine whole group, small group, individual supports, and next steps

## Math Specialist Team

In the spring Jess, Becky, and the principals, along with consultation from the Content Specialists in math and literacy, clarified our math and literacy specialist roles for the future. You can review the memo that Math and Literacy Specialist teams discussed with Jess in June 2022 by [clicking here](#). Kathy O'Connell will shift her role to more directly fit with the description in the document in September 2022. There are many aspects to the Content Specialist role, but four key ones to highlight include:

- Visionary for their K-5 content area
- Map and refine curriculum and pacing for K-5 in collaboration with teachers and coaches
- Meet with teams before units to focus the team on essential components of learning, including AIDE and Deeper Learning
- Serve as K-5 faculty's point of contact when troubleshooting curricular and pacing questions and problems of practice (unless the faculty member is in the midst of a coaching cycle, in which the teacher should talk with their coach)

As the memo notes, the rest of the math team will not shift roles entirely until 2023. For the upcoming year, folks should expect that on the Lincoln campus Carol will provide the bulk of intervention services for students in K-3, and Ellen will do the same for 4th-5th graders. This will be mirrored at Hanscom, with Elaine supporting the bulk of students receiving intervention in K-3, and Carolyn doing the same for 4th-5th graders. Carolyn and Ellen will both also support a few middle school teachers. Please note that based on student needs and schedules, any math specialist might support students on any grade level, just like literacy specialists.

## Other Important Resources

1. This math [Remediation Document](#) is still **very much in draft form** but its goal is to identify key mathematical concepts that help teachers (classroom, special educators, math specialists, tutors, etc.) understand what students truly need at each grade level for success and generate instructional ideas for when students have not yet acquired these. This document came about after various teachers (special educators, classroom teachers, etc.) asking math specialists for advice about what building blocks are most essential and resources to support those ideas. The Math Specialist team will continue to develop this resource and finalize it in the 2022-23 school year for all to use.
2. [Massachusetts State Standards](#)
3. PD and guiding books/thinkers/tools



**UNDER CONSTRUCTION -- MORE UPDATES COMING SOON!**