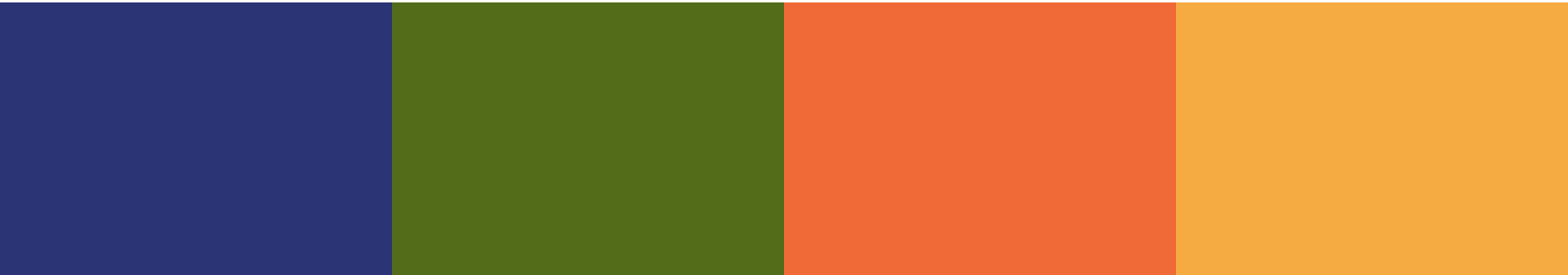
Math Resource Guide

LPS School Committee 9/8/22



Purpose of Guide - and why it was created

- **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

Beliefs and Values

We believe that:
Math is...

- more than numbers and analytic skills in linear ways
- about relationships, truth, and connecting ideas
- the communication of numbers, pictures, and words as they represent ideas
- funun
- engaging and enjoyableMath 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

Typical Lesson Agenda

In every lesson!

Agenda	Looks like	Sounds like
Clear **Learning Target** 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
Mini-lesson 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
Targeted small groups with tailored instruction -- all based on students next learning steps	Different types of stations are used -- for example: • one group is with a teacher receiving explicit instruction • another adult reinforces a topic that's already been been taught but needs practice • students work in groups that involve use of technology (like DreamBox), a game, fact fluency, or a set of math boxes, etc. 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
Closing of the lesson	Students are able to succinctly reflect on and summarize the *learning* they did during the lesson that helped them achieve the Learning Target	

Process

1. Standards Prioritization
    a. green (the most important);
    b. yellow (less important at this grade level and could just be exposure for students and will not be assessed);
    c. Red (least important in comparison and could be skipped in service of depth in other areas)
2. Curriculum Pacing
3. Enhancement
4. Assessment Alignment

Standards Prioritization

Stop lights - for teachers

Grade 3 Math Standards Prioritization

Rather than 27 equal standards, educators should focus on the 22 prioritized green ones and in particular, the 8 starred clusters and 3 stop signs, signaling a "hard stop" where mastery is expected

Massachusetts State Standard	Lincoln Language Translation (when we felt it was necessary or helpful)	Prioritization Must have / Exposure / Least important
Operations and Algebraic Thinking		
★ **Represent and solve problems involving multiplication and division** 🛑		
Interpret products of whole numbers, e.g., interpret 5 x 7 as the total number of objects in five groups of seven objects each	Equal groups, equal amounts in each group; interpret the multiplication symbols as "groups of," "rows of"	
Interpret whole-number quotients of whole numbers, e.g., interpret 56/8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each	Interpret division situations (15 students→3 teams: how many students are on each team vs. 15 students and 3 students on each team: how many teams?)	
Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem		
Determine the unknown whole number in a multiplication or division equation relating three whole numbers	Finding missing factors and/or products (i.e. Fact Families)	
★ **Understand properties of multiplication and the relationship between multiplication and division**		
Apply properties of operations to multiply (Students need not use formal terms for these properties. Students are not expected to use distributive notation)	Commutativity: order of factors may be switched and the answer will be the same; Distributivity: 8 x 4 is the same thing as 8 x 2 plus 8 x 2	
Understand division as an unknown-factor problem	Understand division as related to multiplication. You can figure out 24÷6 = ? by thinking about 6 x ? = 24	
★ **Multiply and divide within 100** 🛑		
Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 5 = 40, one knows 40 5 = 8) or properties of operations; by the end of grade 3, know from memory all products of two single-digit numbers and related division facts	Know basic facts fluently within 100	
★ **Solve problems involving the four operations, and identify and explain patterns in arithmetic**		
Solve two-step word problems using the four operations for problems posed with whole numbers and having whole number answers; represent these problems using equations with a letter standing for the unknown quantity; assess the reasonableness of answers using mental computation and estimation strategies, including rounding	Solve two-step word problems and represent the problems with a number sentence with unknown	
Identify arithmetic patterns (including patterns in the addition table or multiplication table) and explain them using properties of operations		
Number and Operations in Base Ten		

Curriculum Pacing Guide

Grade 3 Curriculum Pacing Guide

Overview	1
Yearlong Priorities	2
Unit 1 - Math Tools, Time and Multiplication	4
Unit 2 Number Stories and Arrays	6
Unit 3 Operations	8
Unit 4 Measurement and Geometry	10
Unit 5 Fractions and Multiplication Strategies	12
Unit 6 More Operations	14
Unit 7 Fractions	16
Unit 8 Multiplication and Division	18
Unit 9 - Multi Digit Operations	20

- Standards Cluster "Stop Lights"
- Unit Pacing for the Year
- Small Group Resources
- Enhancements to each unit and inclusion of fact fluency tools, inquiry-based, collaborative learning opportunities that align more with our Portrait of a Learner (and thus AIDE, SEL, and Deeper Learning)
- Assessment, Scoring Criteria, and links to Analysis Spreadsheets

Unit Pacing Example

Unit 1 - Math Tools, Time and Multiplication

Additions for Unit 1
Esti-Mysteries - replace Mental Math and Fluency. Lessons replaced based on teacher's judgment • #244 Did You Just Round the Round Beads? - digit , even, nearest 10 • #257 Hiding on Top of the Die - not, consecutive numbers, more than
Graham Fletchy Flashcards 2's and 5's flashcards

Unit 1 - Math Tools, Time and Multiplication
Pacing (11 days, 5 additional for Beginning of Year Assessment) Begin Unit on September 8, 2022 Unit Completed by September 30, 2022

Pulling everything together!

Unit Pacing Example Continues

Lesson	Cluster	Timing/days
1-1 Number Grids	out	
1-2 Intro the Student Reference Book	out	
1-3 Tools for Mathematics	out	
1-4 Number Lines and Rounding	Use place value understanding and the properties of operations to perform multi-digit arithmetic	2 days
1-5 Time	Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects	
1-6 Open Response - How Long is Morning?	Use place value understanding and the properties of operations to perform multi-digit arithmetic	
1-7 Scaled Bar Graphs	Represent and interpret data	1 day
1-8 Multiplication Strategies	Represent and solve problems involving multiplication and division	2 days
1-9 Introducing Division	Multiply and divide within 100	2 days
1-10 Foundational	Multiply and divide within 100	1 day
Multiplication Facts		
1-11 Length-of-Day Project	out	
1-12 Explore Mass, Equal Shares, Equal Groups	Understand properties of multiplication and the relationship between multiplication and division -- **Only Equal Shares and Equal Groups-Exploration B and C**	
1-13 Measuring Mass	out	
Fact Fluency	Check in with students on 2's, 5's and 10's facts. If not fluency - Graham Fletch Cards 2's and 5's flashcards	1 day
1-14 End of Unit 1 Assessment	Grade 3 End of Unit 1 Assessment Grade 3 End of Unit 1 Scoring Criteria Grade 3 Fact Fluency Assessment 2's, 5's, 10's	1 day
Total		11 days

Prioritized lessons in each unit based on the Domains/Standards.

All assessments are linked.

Next Steps

- Using the guide
- Making adjustments through learning (doc is *dynamic*)
- 6-8 development