

Learning Mathematics through Representations (LMR)/ Kentucky Academic Standards for Mathematics Crosswalk

LMR created by G. Saxe and M. Gearhart, UC Berkeley



Positive Integers

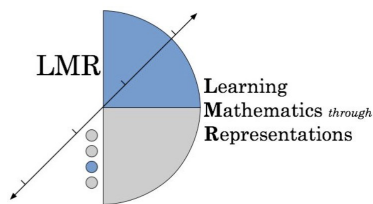
LMR Lessons	Title (New Principle or Definition)	KAS Standards	Notes/Clarifications
Pos Integers 1	Cuisenaire Rod Relationships		This exploration is useful for any class being introduced to Cuisenaire Rods for the first time. No specific standard applies.
Pos Integers 2	Introduction to Number Lines Order 0 is a number	KY.2.MD.6	
Pos Integers 3	Unit Intervals Interval Unit Interval	KY.2.MD.6	
Pos Integers 4	Multiunit intervals Multiunit Interval Every Number has a place	KY.2.MD.6 KY.2.NBT.2	While this lesson uses multiples other than 5, 10 and 100, it will help make the connections between skip counting and addition and strengthen students understanding of a number line. Working with other multi-units, such as 3, is foundational for multiplication strategies including skip-counting
Pos Integers 5	Coordinating Unit and Multiunit Intervals	KY.2.MD.6 KY.2.NBT.2	This lesson connects skip counting to Number Line and helps establish an ENL as a way of recording skip counting and multiplicative thinking. Teachers can take this lesson to KY.3.OA.1 by connecting the number line visual to multiplicative notation (e.g. 4x3 relates to a number line marked using a multiunit of 3).
Pos Integers 6	Finding Missing Numbers	KY.2.MD.6 KY.2.NBT.2 (see note)	Most tasks in this lesson involve skip counting by 2, 3, 5 or 10 using additive thinking that is appropriate for Grade 2 students. Worksheet 4 extends the number range to 3,000 and should be omitted for most Grade 2 students.
Pos Integers 7	Using Informal Measurement Tools	KY.2.MD.6	
Pos Integers 8	Positive Integer Review	KY.2.MD.6 KY.2.NBT.2	



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Learning Mathematics through Representations: <https://www.kentuckymathematics.org/lmr.php>

Kentucky Academic Standards for Mathematics: https://education.ky.gov/curriculum/standards/kyacadstand/Documents/Kentucky_Academic_Standards_Mathematics.pdf



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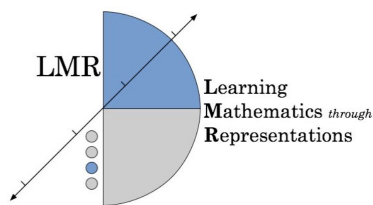
Negative Integers

LMR Lessons	Title (New Principle or Definition)	KAS Standards	Notes/Clarifications
Neg Integers 1	Introduction to Negative Numbers Symmetry	KY.6.NS.6 a&b	Clarification of KY.6.NS.6a applies here: "Emphasis is on student understanding that every positive location on a number line has an opposite the same distance from zero in the negative direction and vice versa."
Neg Integers 2	Using Symmetry	KY.6.NS.6 a&b (see note)	Limited to integers on a horizontal number line.
Neg Integers 3	Symmetry and Estimation	KY.6.NS.6 a&b (see note)	Limited to integers on a horizontal number line.
Neg Integers 4	Ordering and Comparing	KY.6.NS.7 a (see note)	Ordering is addressed. Absolute Value is not introduced in this lesson but this idea and notation could be added.

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Fractions (Page 1 of 2)

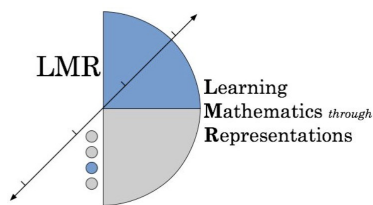
LMR Lessons	Title	KAS Standards	Notes/Clarifications
Fractions 1	Subunit Intervals	KY.3.NF.2 a&b KY.3.G.2	Lesson assumes students already have a good understanding of fractions represented by an area model (KY.3.G.2) and is working to connect this understanding to an number line.
Fractions 2	Defining Denominator, Numerator and Fraction	KY.3.NF.2 a&b	
Fractions 3	Labeling Fractions and Understanding lengths of subunits	KY.3.NF.2 a&b KY.3.NF.3	Some connection to a portion of KY.1.G.3 that states "Understand in these examples that decomposing into more equal shares creates smaller shares".
Fractions 4	Fractions less than 1 - Measuring Lengths	KY.3.NF.2 a&b	
Fractions 5	Reasoning about Fractions less than 1	KY.3.NF.2b	
Fractions 6	Measuring Distances Less than 1	KY.3.NF.2b	
Fractions 7	Mixed Numbers	KY.3.NF.2b KY.4.NF.3b	While KY.3.NF.2b does not explicitly state students should located mixed numbers, they are expected to locate numbers greater than one in fraction form. LMR approaches this by starting with mixed numbers in Lesson 7, then relating the mixed numbers to equivalent number in fraction form (e.g. $1 \frac{1}{3}$ is in the same position as $\frac{4}{3}$) in Lesson 8. We think making these connections in the context of a number line supports appropriate Grade 3 understanding of fractions greater than one. KY.4.NF.3b is the first standard to explicitly reference mixed numbers and builds on the understanding developed in this lesson.



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Fractions (Page 2 of 2)

LMR Lessons	Title	KAS Standards	Notes/Clarifications
Fractions 8	Fractions Greater than 1	KY.3.NF.2b KY.4.NF.3b	While KY.3.NF.2b does not explicitly state students should locate mixed numbers, they are expected to locate numbers greater than one in fraction form. LMR approaches this by starting with mixed numbers in Lesson 7, then relating the mixed numbers to equivalent number in fraction form (e.g. $1 \frac{1}{3}$ is in the same position as $\frac{4}{3}$) in Lesson 8. We think making these connections in the context of a number line supports appropriate Grade 3 understanding of fractions greater than one. KY.4.NF.3b is the first standard to explicitly reference mixed numbers and builds on the understanding developed in this lesson.
Fractions 9	Introduction to Equivalent Fractions	KY.3.NF.3a KY.4.NF.1 (see note)	Strategies based on partitioning the number line and counting spaces align to KY.3.NF.3. Moving to more sophisticated strategies including generalizing the formula $a/b = (nxa)/(nxb)$ aligns to KY.4.NF.1
Fractions 10	Equivalent Fractions - More Strategies	KY.3.NF.3 a&b KY.4.NF.1 (See note)	Strategies based on partitioning the number line and counting spaces align to KY.3.NF.3. Moving to more sophisticated strategies including generalizing the formula $a/b = (nxa)/(nxb)$ aligns to KY.4.NF.1
Fractions 11	Which Fractions are Equivalent?	KY.3.NF.3 a&b KY.4.NF.1 (See note)	Strategies based on partitioning the number line and counting spaces align to KY.3.NF.3. Moving to more sophisticated strategies including generalizing the formula $a/b = (nxa)/(nxb)$ aligns to KY.4.NF.1
Fractions 12	Ordering and Compare with Benchmarks	KY.4.NF.2	Some problems appropriate for KY.3.NF.3.
Fractions 13	Ordering and Comparing	KY.4.NF.2	
Fractions 14	Fractions Review	See previously listed standards	

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