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FOR MATHEMATICS

Focus on Fractions -

Addition and Subtraction with Unlike Denominators with Lisa Riggs

Welcome!

Your host

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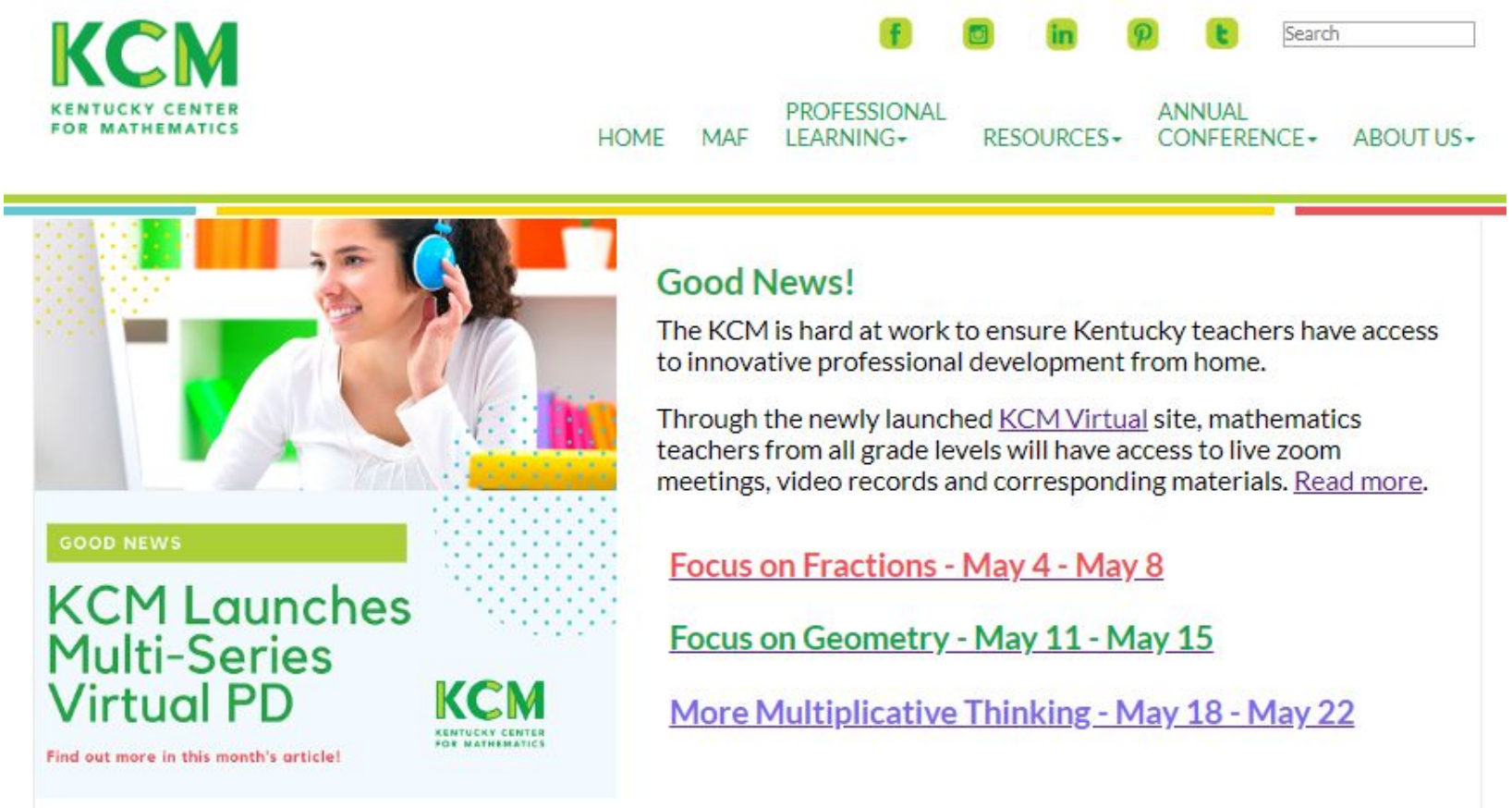
KCM Website

www.kentuckymathematics.org



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Today's Agenda

- Research
- Standards
- Activities
- Resources

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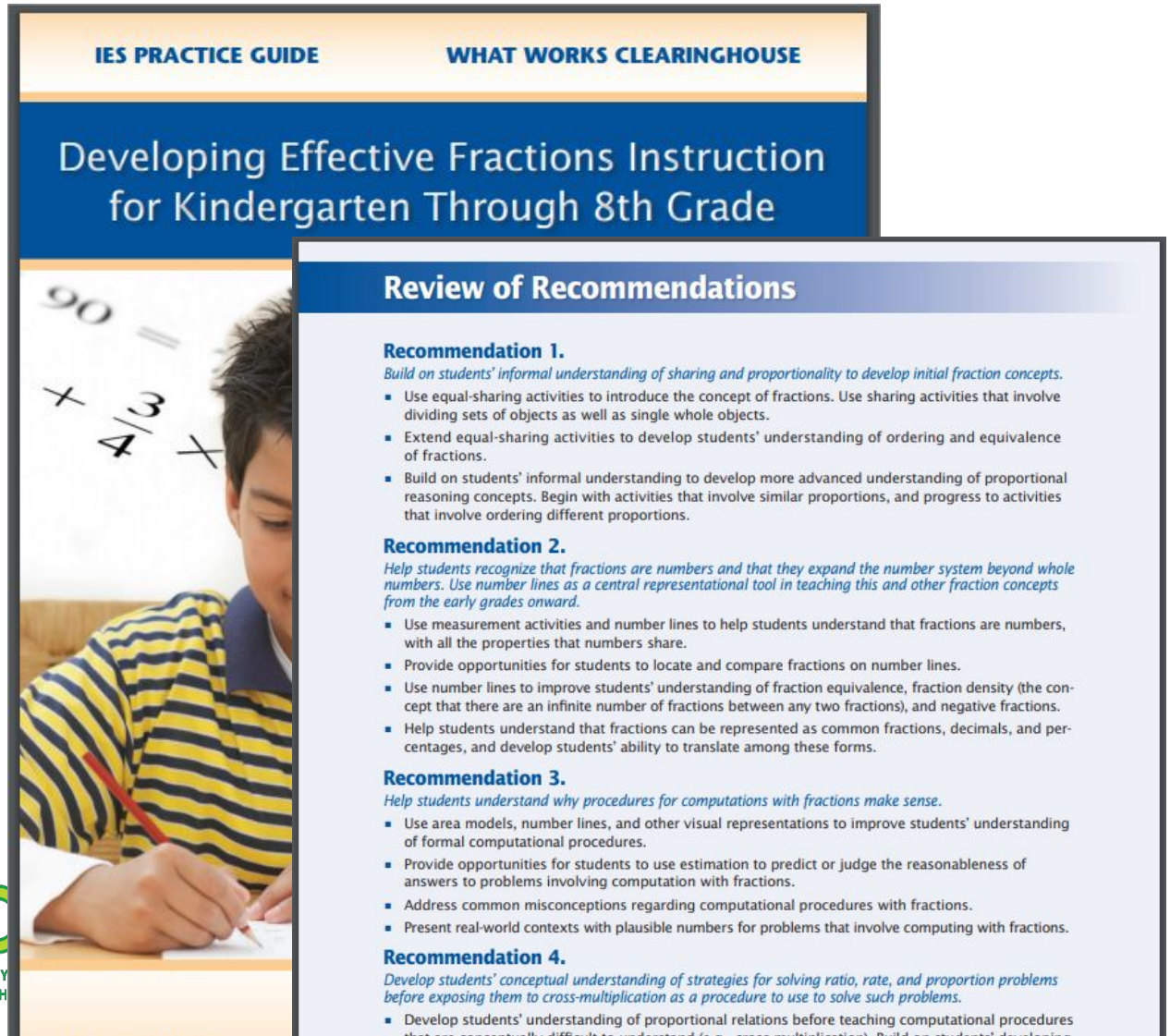
Always, Sometimes, Never

To add or subtract fractions with unlike denominators you must first find a common denominator.

Research



Link: https://ies.ed.gov/ncee/wwc/Docs/PracticeGuide/fractions_pg_093010.pdf

IES Recommendations

Recommendation 3

Help students understand why procedures for computations with fractions make sense.

Students are most proficient at applying computational procedures when they understand why those procedures make sense. Although conceptual understanding is foundational for the correct use of procedures, students often are taught computational procedures with fractions without an adequate explanation of how or why the procedures work.

Teachers should take the time to provide such explanations and to emphasize how fraction computation procedures transform the fractions in meaningful ways. In other words, they should focus on both conceptual understanding and procedural fluency and should emphasize the connections between them. The panel recommends several practices for developing understanding of computational procedures, including use of visual representations and

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Quote from Greg Tang

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Standards

Number and Operations - Fractions	
Standards for Mathematical Practice	
MP.1. Make sense of problems and persevere in solving them. MP.2. Reason abstractly and quantitatively. MP.3. Construct viable arguments and critique the reasoning of others. MP.4. Model with mathematics.	MP.5. Use appropriate tools strategically. MP.6. Attend to precision. MP.7. Look for and make use of structure. MP.8. Look for and express regularity in repeated reasoning.
Cluster: Use equivalent fractions as a strategy to add and subtract fractions.	
Standards	**Clarifications**
KY.5.NF.1 Efficiently add and subtract fractions with unlike denominators (including mixed numbers) by… • using reasoning strategies, such as counting up on a number line or creating visual fraction models • finding common denominators **MP.2, MP.3**	Using common denominator $\frac{2}{3}+\frac{5}{4}=\frac{8}{12}+\frac{15}{12}=\frac{23}{12}$ In general, $\frac{a}{b}+\frac{c}{d}=\frac{(ad+bc)}{bd}$ KY.4.NF.1 Coherence KY.4.NF.3→ KY.5.NF.1→KY.6.EE.7
KY.5.NF.2 Solve word problems involving addition and subtraction of fractions. a. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators. b. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. **MP.1, MP.4**	a. For example: Mary ate $\frac{1}{3}$ of the pizza. Tommy ate $\frac{2}{5}$ of the pizza. How much of the total pizza did they eat together? • making equivalent fractions to add/subtract fractions • using visual representations to add/subtract fractions ○ Area Model ○ Linear Model b. Recognize an incorrect result $\frac{2}{5}+\frac{1}{2}=\frac{3}{7}$, by observing that $\frac{3}{7}<\frac{1}{2}$. Note: Estimation skills include identifying when estimation is appropriate, determining method of estimation and verifying solutions or determining the reasonableness of situations using various estimation strategies. The skill of estimating within context allows students to further develop their number sense. Coherence KY.4.NF.3→KY.5.NF.2
Attending to the Standards for Mathematical Practice	
As students add and subtract fractions, they make sense of situations in story problems, selecting and creating representations of the situation such as partitioned rectangles or number lines (**MP.1**, **4**). Students notice if the fractions in the problem can be solved using a reasoning strategy, or if it is more efficient to find common denominators (**MP.2**). For example, for the problem $2\frac{3}{4}+3\frac{1}{2}$, students may mentally or physically refer to a ruler and use a counting up strategy:	

What do you notice?

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Teacher: see presenter

What if . . .

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Teacher: see presenter

How many number sentences can you come up with?

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Teacher: see presenter

Let’s share!

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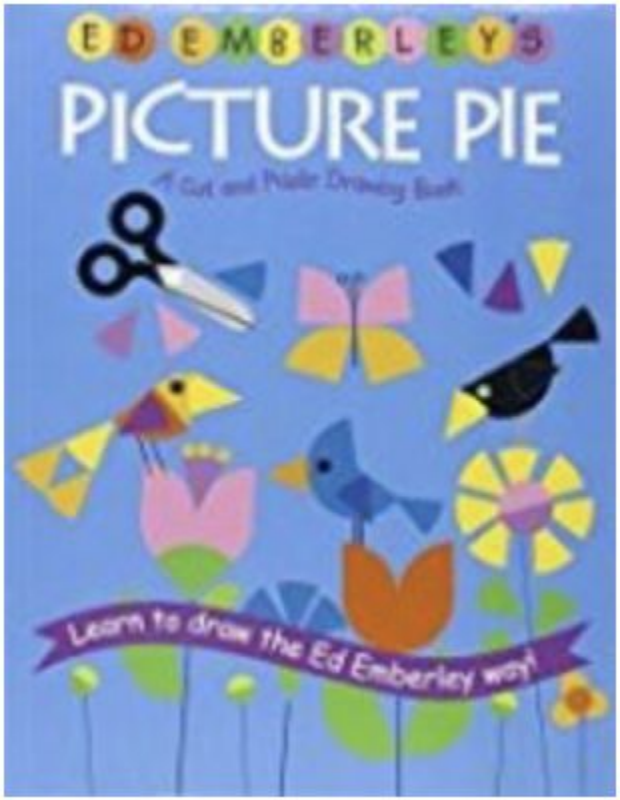
Teacher: see presenter

Picture Pie



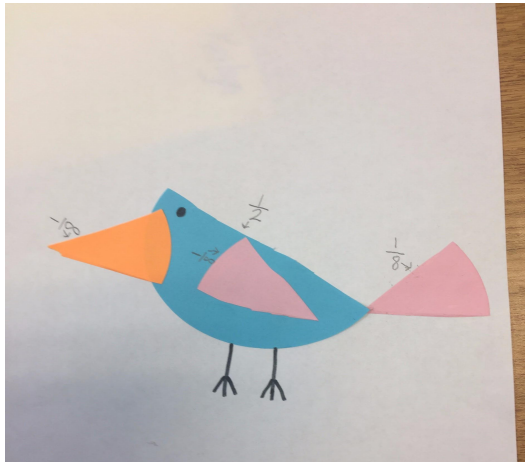
Picture Pie

Materials: copy of *Picture Pie* by Ed Emberley, fraction circles, scissors, glue

1. Look closely at the artwork in Picture Pie.
2. Fold paper circles into halves, fourths or eighths.

3. Cut, paste and color your circle pieces to create a picture.
4. Name the fractions used to create your picture.

Challenge: Put together pieces from a fraction kit to find the total value of your picture. Explain your thinking.



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Picture Pie

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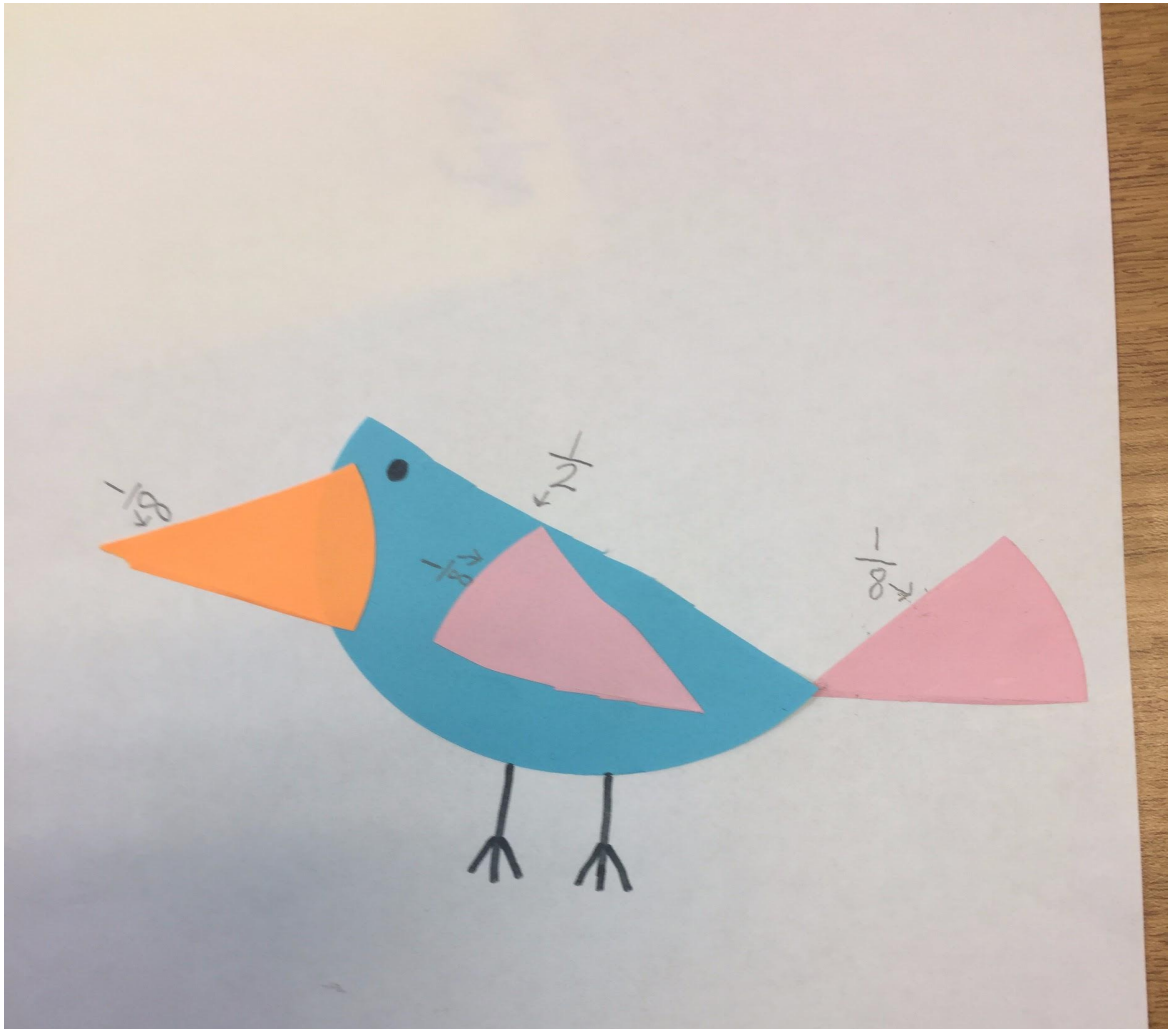
Picture Pie



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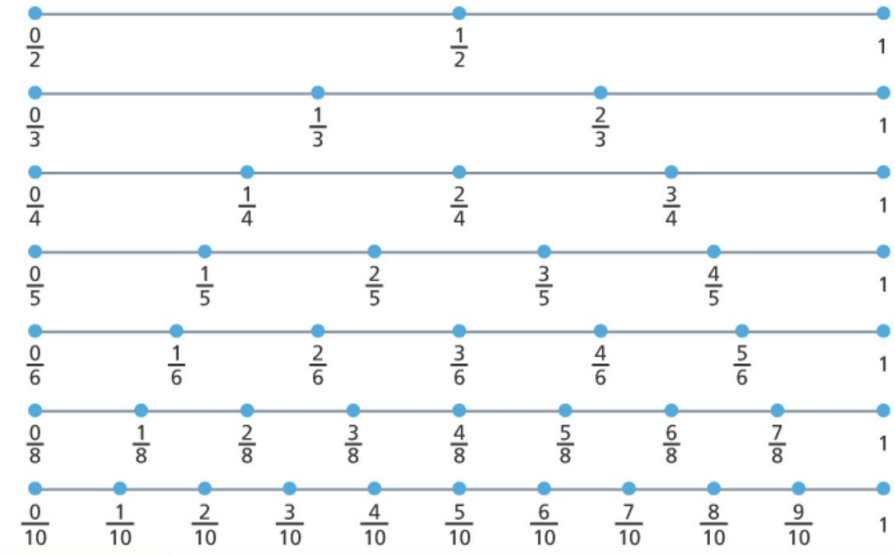
Fraction Track

Fraction Track

Directions

Drag chips to the tracks on the gameboard. Deal a fraction card. Move a chip, or chips, to total the amount shown.



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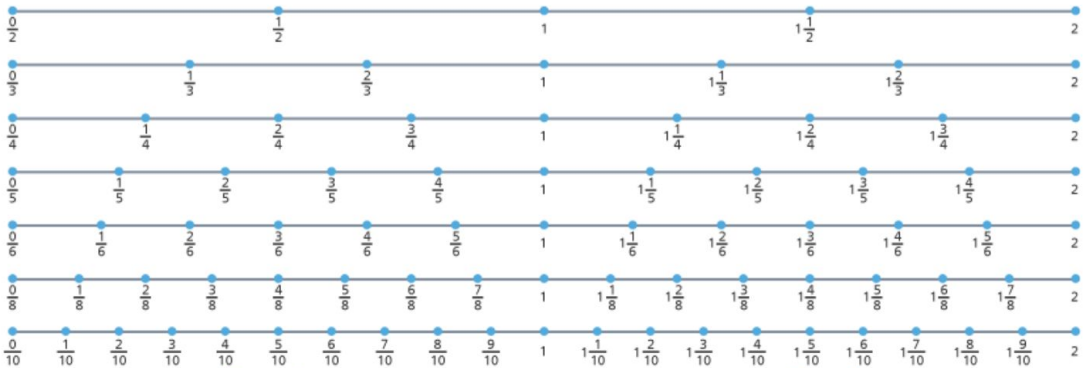
Fraction Track to 2

Fraction Track to 2

Directions

Drag chips to the tracks on the gameboard. Deal a fraction card. Move a chip, or chips, to total the amount shown.

Fraction Cards



Start Over

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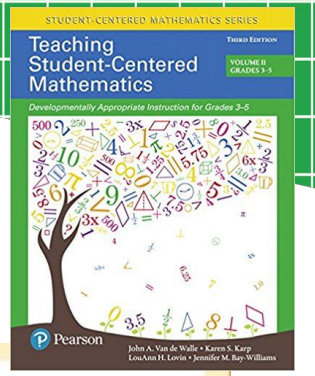
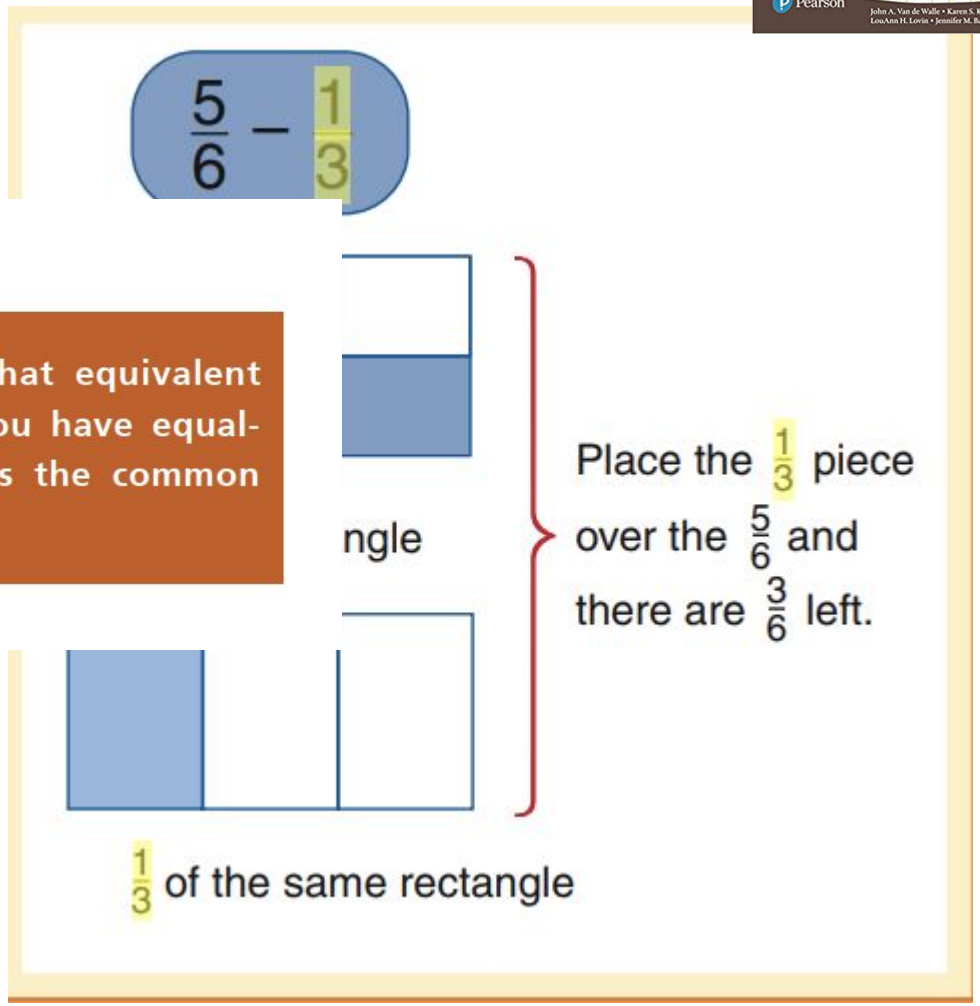
Moving from materials to symbols



Teaching Tip

To reinforce equivalences, ask "What equivalent fractions might you use so that you have equal-sized parts?" rather than "What is the common denominator?"



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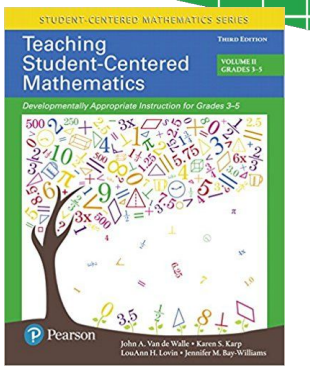
Moving from materials to symbols



- Begin by using task where only 1 denominator has to be changed.
  $\frac{5}{8} + \frac{3}{4}$

  The key question is - "How can we change this problem into one in which the parts are the same sized units?"
- Then continue to examples in which both fractions need to be changed. $\frac{2}{3} - \frac{1}{4}$

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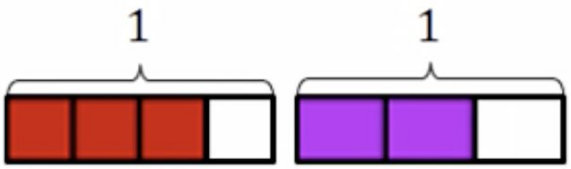
Fraction Progession - Addition of Fractions

5th: Adding unlike denominators



$$\frac{3}{4}+\frac{2}{3}$$

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Resources

Investigation games

Howard County Public School System

Georgia Standards Framework

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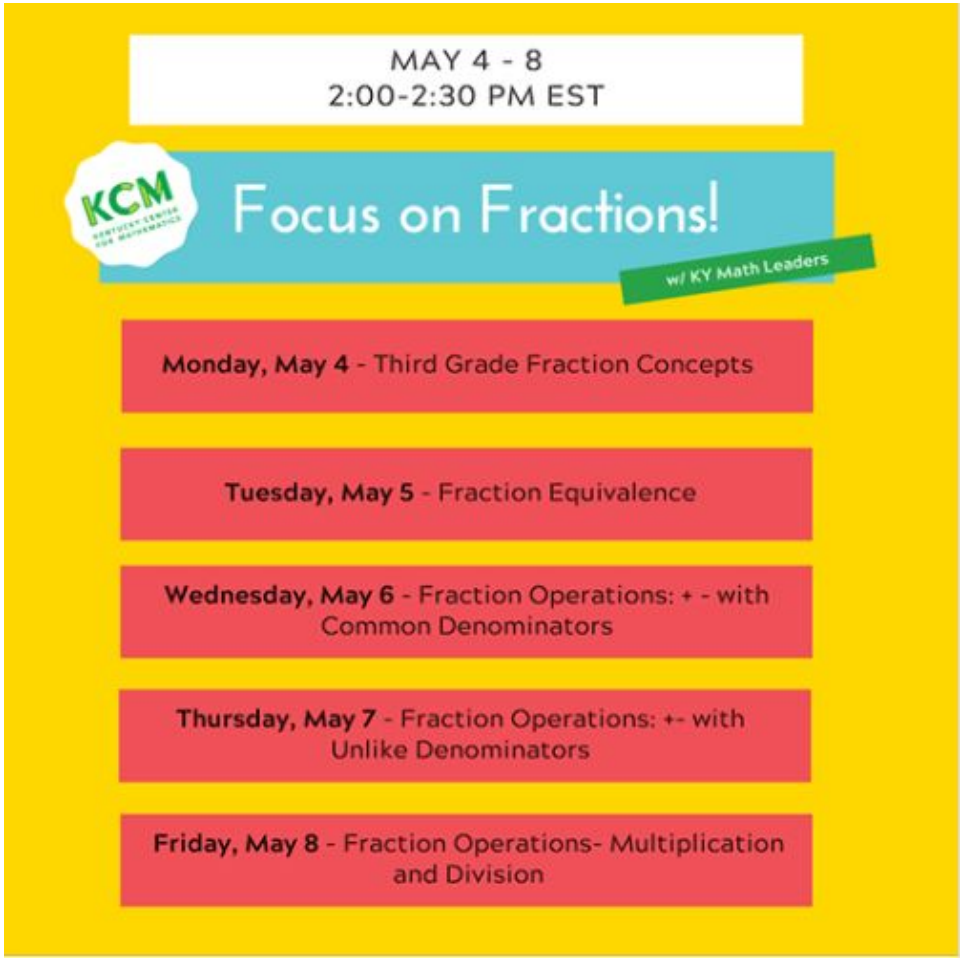
Upcoming Sessions



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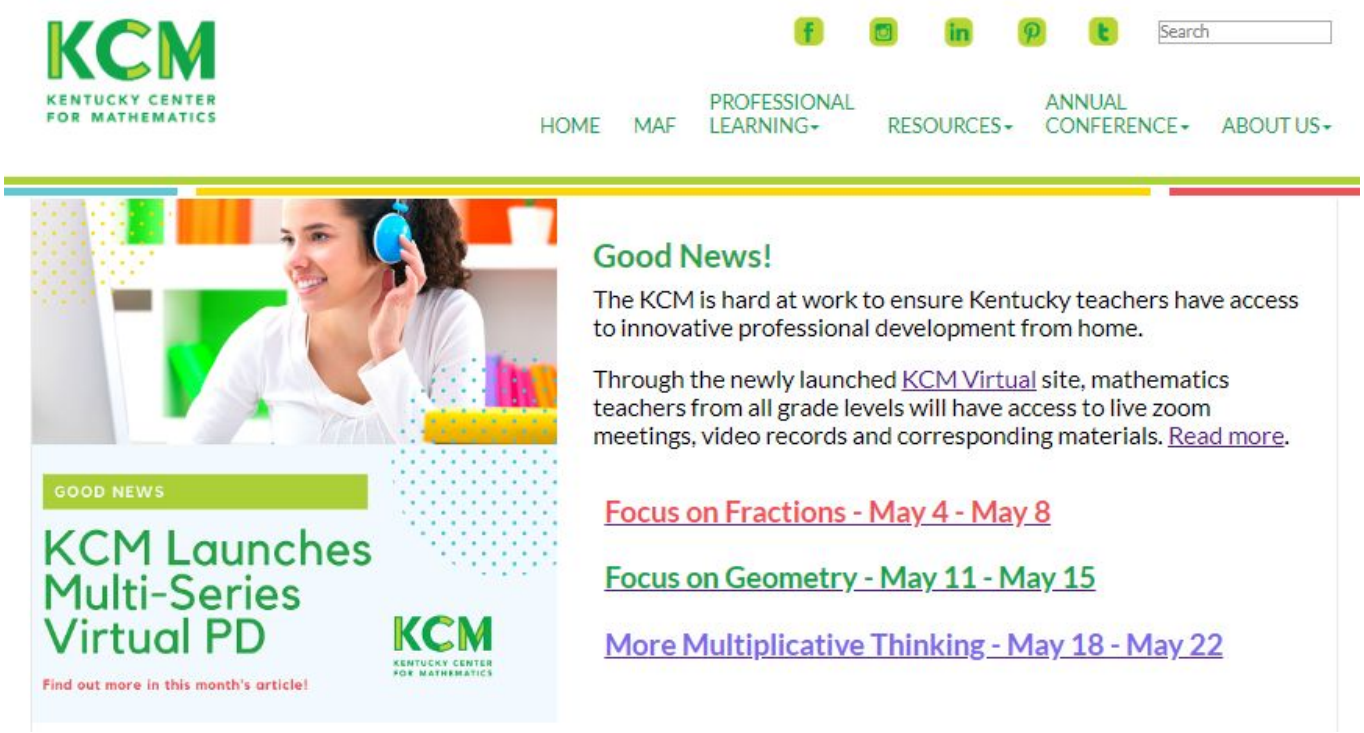

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KCM is here to support you!

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