

# Welcome Parents of Fourth Grade Math Students



4<sup>th</sup> Grade Math Transition Unit

# Outcomes



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*By the end of this training, participants will be able to:*

- Communicate the rationale for the Grade 4 CCSS Transition Unit 2013.
- Describe the shifts in the teaching and learning of fractions in Curriculum 2.0.
- Clarify the plan for implementation of the Grade 4 CCSS Transition Unit 2013.

# Rationale

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## ROLL-OUT PLAN

	2012- 2013	2013- 2014	2014- 2015	2015- 2016	2016- 2017
<b>C2.0 Kindergarten–Math 3</b>					
<b>C2.0 Math 4</b>					
<b>C2.0 Math 5</b>					
<b>C2.0 Math 6</b>					
<b>C2.0 Math 7 &amp; C2.0 I.M.</b>					
<b>C2.0 Math 8</b>					
<b>C2.0 Algebra 1</b>					
<b>C2.0 Geometry</b>					
<b>C2.0 Algebra 2</b>					
<b>C2.0 Pre-Calculus</b>					

*Shading identifies years of implementation.*

# Key Understandings of Fractions

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## Shifts in Instruction of Fractions

- A. Unit fractions
- B. Fractions as numbers on a number line
- C. Equivalence of fractions
- D. Comparing and ordering of fractions
- E. Operations with fractions

# Key Understanding of Unit Fractions



















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A. Understand that “just as every whole number is obtained by combining a sufficient number of 1s, every fraction is obtained by combining a sufficient number of unit fractions.”

# Unit Fraction - Equal Area

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Examples of Relationships Among Blocks in an Expanded Set of Pattern Blocks

Whole	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{3}$	$\frac{1}{6}$
					
					
					
					
					
					

# Key Understandings of Fractions on a Number Line

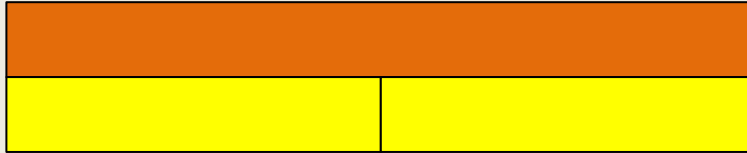
7

A. Understand that “just as every whole number is obtained by combining a sufficient number of 1s, every fraction is obtained by combining a sufficient number of unit fractions.”

B. Understand a fraction as a number on the number line.

## Transition Unit Week 2

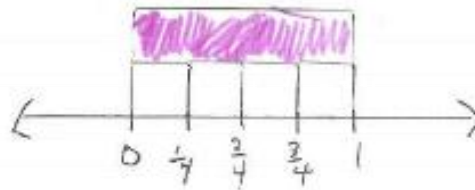
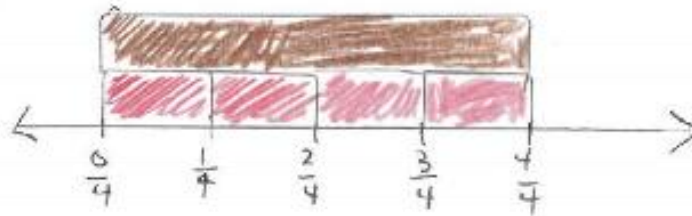
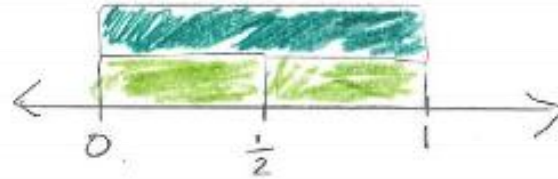
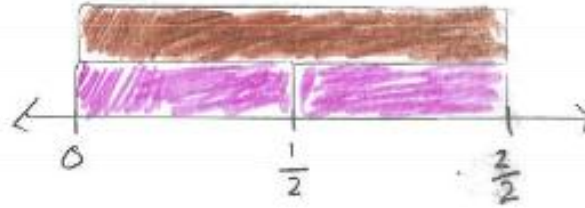
If the orange bar is the whole ...



... the yellow bar represents  $\frac{1}{2}$  the length of the whole.

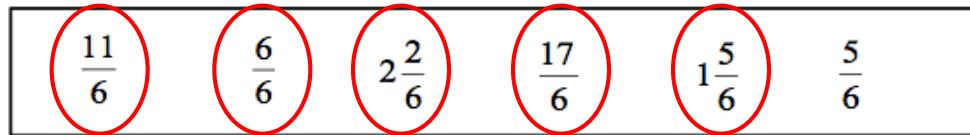
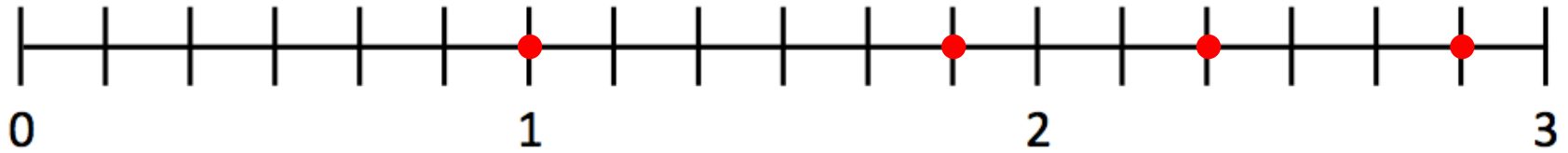


Sample Cuisenaire® Rod Number Lines - 1



Transition Unit Week 2

Number Line A



Fractions equivalent to whole numbers

Fractions greater than 1

Mixed numbers

# Key Understandings of Comparing & Ordering Fractions

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**C. Understand two fractions as equivalent if they are the same size or the same point on a number line.**

**D. Understand and apply a variety of strategies to compare and order fractions by reasoning about their size.**

# Equivalence of Fractions

## Comparing and Ordering Fractions

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## Reason to Compare Fractions

Which fraction in each pair is greater?  
Compare the fractions by reasoning about their size.

A. $\frac{6}{10}$ or $\frac{5}{12}$	B. $\frac{2}{8}$ or $\frac{2}{6}$
C. $\frac{6}{12}$ or $\frac{7}{10}$	D. $\frac{67}{100}$ or $\frac{75}{100}$
E. $\frac{25}{12}$ or $\frac{11}{5}$	F. $\frac{3}{4}$ or $\frac{9}{10}$
G. $\frac{6}{12}$ or $\frac{45}{100}$	H. $\frac{5}{8}$ or $\frac{7}{12}$
I. $\frac{2}{8}$ or $\frac{8}{2}$	J. $\frac{4}{9}$ or $\frac{5}{8}$

# Key Understandings of Operations with Fractions

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**E. Understand operations with fractions as an extension of operations with whole numbers (e.g., equal groups, equal shares, properties of operations, relationship between addition and subtraction, relationship between multiplication and division).**

Adapted from:

“Progression for the Common Core State Standards in Mathematics: Number and Operations – Fractions” (August 2011)

Mai takes swim lessons for  
 $\frac{3}{4}$  of an hour each week day.

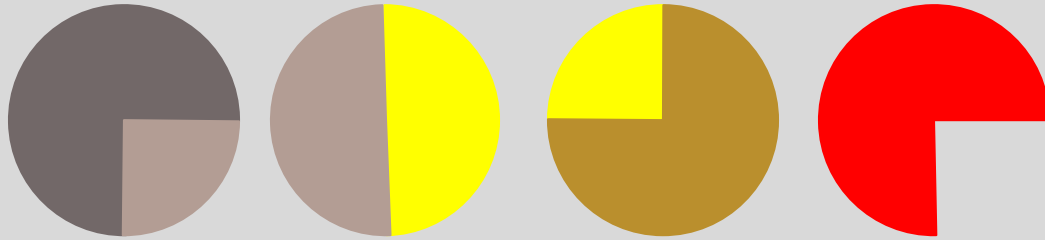
How much time does she spend at lessons in a week?



Draw a picture to represent the problem.

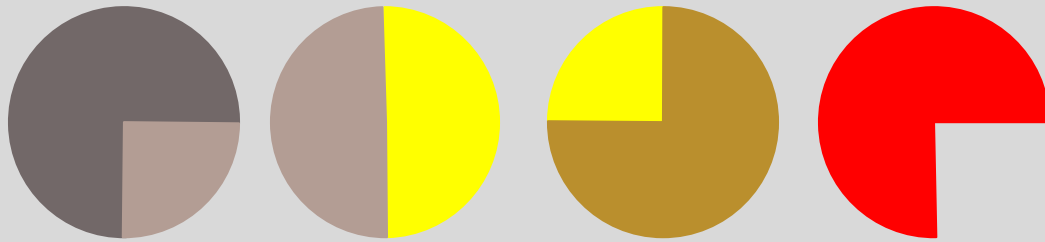
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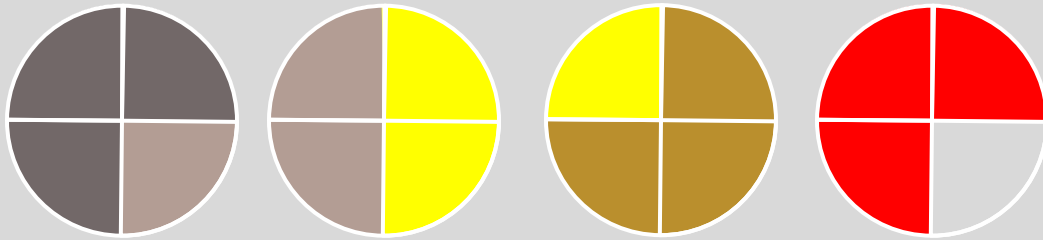


$$5 \times \frac{3}{4} = \frac{15}{4}$$

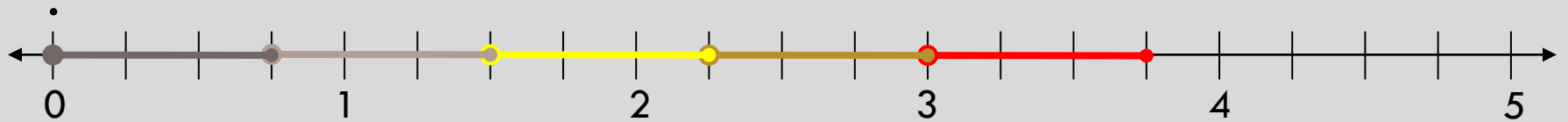


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How much time does she spend at lessons in a week?



Each  $\frac{3}{4}$  is 3 copies of  $\frac{1}{4}$ . So,  $\frac{3}{4}$  repeated five times is 15 copies of  $\frac{1}{4}$



$$5 \times \frac{3}{4} = \frac{15}{4}$$

$$15 \times \frac{1}{4} = \frac{15}{4}$$

## Grade 5 : Multiplication of a Fraction by a Whole Number

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- Why are understandings about unit fractions critical to students ability to solve and explain?

**Yesenia made 3 gallons of iced tea.**

**$\frac{5}{8}$  of the tea is left.**

**How many gallons of iced tea are left?**

# Grade 4 CCSS Transition Unit 2013

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- End of Unit 4 Math Assessment will be adapted to reflect the timing of the transition unit start. (April 3<sup>rd</sup>) – No parent report
- No End of Unit 5 Math Assessment will be given – No parent report
- No End of Year Math Assessment Summaries
- Formative Assessments will be given throughout the Transition Unit
- Focus on Fractions and Mastery with fluency of basic facts

# Thank you

# Equivalence of Fractions

## Comparing and Ordering Fractions

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### Grade 4 Common Core State Standards (CCSS) Transition Unit 2013

Grades 3 & 4 Curriculum 2.0 Indicators	Week
<p><b>Develop understanding of unit fractions and fractions as numbers.</b></p> <p>1.3.D.1 Understand a fraction <math>\frac{1}{b}</math> as the quantity formed by 1 part when a whole is partitioned into <math>b</math> equal parts; understand a fraction <math>\frac{a}{b}</math> as the quantity formed by <math>a</math> parts of size <math>\frac{1}{b}</math>.</p>	1
<p>1.3.D.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.</p> <ul style="list-style-type: none"> <li>Represent a fraction <math>\frac{1}{b}</math> on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into <math>b</math> equal parts. Recognize that each part has size <math>\frac{1}{b}</math> and that the endpoint of the part based at 0 locates the number <math>\frac{1}{b}</math> on the number line.</li> <li>Represent a fraction <math>\frac{a}{b}</math> on a number line diagram by marking off a lengths <math>\frac{1}{b}</math> from 0. Recognize that the resulting interval has size <math>\frac{a}{b}</math> and that its endpoint locates the number <math>\frac{a}{b}</math> on the number line.</li> </ul>	2,3
<p>1.3.D.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.</p> <ul style="list-style-type: none"> <li>Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.</li> <li>Recognize and generate simple equivalent fractions, e.g., <math>\frac{1}{2} = \frac{2}{4}</math>, <math>\frac{4}{6} = \frac{2}{3}</math>. Explain why the fractions are equivalent, e.g., by using a visual fraction model.</li> <li>Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. <i>Examples: Express 3 in the form <math>3 = \frac{3}{1}</math>; recognize that <math>\frac{6}{1} = 6</math>; locate <math>\frac{4}{4}</math> and 1 at the same point of a number line diagram.</i></li> <li>Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols <math>&gt;</math>, <math>=</math>, or <math>&lt;</math>, and justify the conclusions, e.g., by using a visual fraction model.</li> </ul>	3,4,5
<p><b>Extend understanding of fraction equivalence and ordering.</b></p> <p>1.4.D.1 Explain why a fraction <math>\frac{a}{b}</math> is equivalent to a fraction <math>\frac{(n \times a)}{(n \times b)}</math> by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.</p>	5,6
<p>1.4.D.2 Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as <math>\frac{1}{2}</math>. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols <math>&gt;</math>, <math>=</math>, or <math>&lt;</math>, and justify the conclusions, e.g., by using a visual fraction model.</p>	5,6

# Indicator Comparison

2.0/CCSS Indicators – Grade 3	MCPS 2001 Indicators – Grade 3
<p><b>Develop understanding of fractions as numbers.</b>  <i>Grade 3 limited to denominators of 2, 3, 4, 6, 8</i></p> <p>1.3.D.1 Understand a fraction <math>\frac{1}{b}</math> as the quantity formed by 1 part when a whole is partitioned into <math>b</math> equal parts; understand a fraction <math>\frac{a}{b}</math> as the quantity formed by <math>a</math> parts of size <math>\frac{1}{b}</math>.</p> <p>1.3.D.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.</p> <ul style="list-style-type: none"> <li>• Represent a fraction <math>\frac{1}{b}</math> on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into <math>b</math> equal parts. Recognize that each part has size <math>\frac{1}{b}</math> and that the endpoint of the part based at 0 locates the number <math>\frac{1}{b}</math> on the number line.</li> <li>• Represent a fraction <math>\frac{a}{b}</math> on a number line diagram by marking off a length <math>\frac{1}{b}</math> from 0. Recognize that the resulting interval has size <math>\frac{a}{b}</math> and that its endpoint locates the number <math>\frac{a}{b}</math> on the number line.</li> </ul> <p>1.3.D.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.</p> <ul style="list-style-type: none"> <li>• Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.</li> <li>• Recognize and generate simple equivalent fractions, e.g., <math>\frac{1}{2} = \frac{2}{4}</math>, <math>\frac{4}{8} = \frac{2}{4}</math>. Explain why the fractions are equivalent, e.g., by using a visual fraction model.</li> <li>• Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. <i>Examples: Express 3 in the form <math>3 = \frac{3}{1}</math>; recognize that <math>\frac{6}{1} = 6</math>; locate <math>\frac{4}{4}</math> and 1 at the same point of a number line diagram.</i></li> <li>• Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols <math>&gt;</math>, <math>=</math>, or <math>&lt;</math>, and justify the conclusions, e.g., by using a visual fraction model.</li> </ul> <p><b>Represent and interpret data.</b></p> <p>2.3.A.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.</p> <p><b>Reason with shapes and their attributes.</b></p> <p>3.3.A.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. <i>For example, partition a shape into 4 parts with equal area, and describe the area of each part as <math>\frac{1}{4}</math> of the area of the shape.</i></p>	<p>6.3.1.2 represent fractions and mixed numbers using numerals and a variety of models.</p> <p>1.3.4.1 plot points to represent whole numbers and fractions with denominators of 2, 3, and 4 on a number line.</p> <p>6.3.2.1 identify equivalent fractions using models and pictures.</p>