Dear Parents,
We will begin our next unit of study in math soon. The information below will serve as an overview of the unit as you work to support your child at home. If you have any questions, please feel free to contact me. I appreciate your ongoing support.

Sincerely,
Your Child's Teacher

Unit Name: Understand Operations with Fractions & Decimals

North Carolina Content State Standards:

NC.4.NF.3 Understand and justify decompositions of fractions with denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100.
- Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
- Decompose a fraction into a sum of unit fractions and a sum of fractions with the same denominator in more than one way using area models, length models, and equations.
- Add and subtract fractions, including mixed numbers with like denominators, by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
- Solve word problems involving addition and subtraction of fractions, including mixed numbers by writing equations from a visual representation of the problem.

NC.4.NF.4 Apply and extend previous understandings of multiplication to:
- Model and explain how fractions can be represented by multiplying a whole number by a unit fraction, using this understanding to multiply a whole number by any fraction less than one.
- Solve word problems involving multiplication of a fraction by a whole number.

NC.4.NF.6 Use decimal notation to represent fractions.
- Express, model and explain the equivalence between fractions with denominators of 10 and 100.
- Use equivalent fractions to add two fractions with denominators of 10 or 100.
- Represent tenths and hundredths with models, making connections between fraction and decimals.

Math Language:

- Fraction
- Addend
- Area Model
- Subtraction
- Tenth

- Area Model
- Sum
- Multiplication
- Difference
- Hundredth

- Number Line
- Mixed Number
- Product
- Decimal
- Circle Model

- Addition
- Improper Fraction
- Equivalent Fraction
- Equivalency

Unit Overview:

In this unit, students will apply their understanding of unit fractions and fraction equivalence to addition and subtraction of fractions. Students will add and subtract fractions including mixed and improper fractions with like denominators. Students will learn how to turn mixed fractions into improper fractions using visual models. Additionally, students will learn how to break improper fractions into mixed numbers by using their understanding of fractions equaling 1 (e.g. $5/3 = 3/3 + 2/3$ or $5/3 = 1 + 2/3$). Students will apply and extend their understanding of adding fractions by multiplying fractions. Just as students see repeated addition as multiplication students will develop an understanding that all fractions are made up of repeated unit fractions ($7/5 = 1/5 + 1/5 + 1/5 + 1/5 + 1/5 + 1/5 + 1/5$ or $7/5 = 7 \times 1/5$). Students are expected to use and create visual fraction models to multiply fractions by whole numbers.

Additionally, students will apply their understanding of fractions to decimal equivalence. Decimals are introduced for the first time in 4th grade. Students will make connections between fractions with denominators of 10 and 100 within the place value chart to help add decimals.

Skills/Strategies:

Students will be able to:
- Justify decompositions of fractions with denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100
- Use equivalent fractions and/or properties of operations to add and subtract fractions with like denominators, including mixed numbers
- Solve word problems involving addition and subtraction of fractions with like denominators, including mixed numbers
- Compose/decompose a fraction into a sum of unit fractions and a sum of fractions with the same denominator in more than one way, using area models, length models, and equations
- Solve word problems involving multiplication of a fraction by a whole number
- Write a number sentence to match visual representations of a whole number multiplied by a unit fraction. (e.g. show 3 x ¼ = ¾ using a model and write an appropriate number sentence matching the model, ¾ = ¼ + ¼ + ¼)
- Use repeated addition as a strategy for multiplying a whole number by a fraction
- Use equivalent fractions to add two fractions with denominators of 10 and 100
- Solve addition of decimals problems using understanding of equivalence, concrete decimal models, and using decimal notation
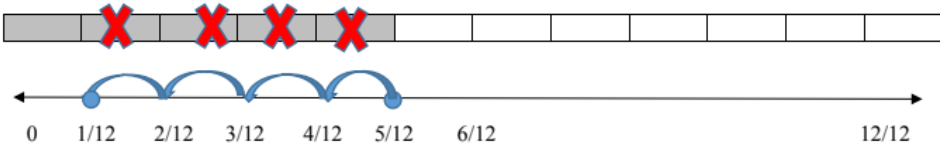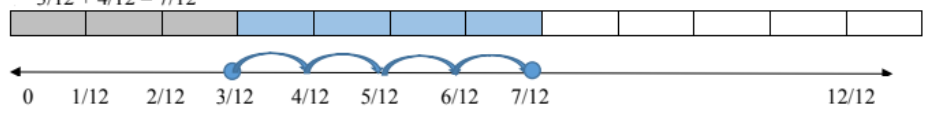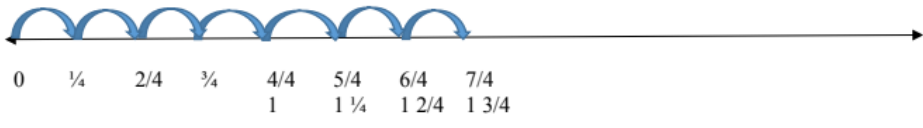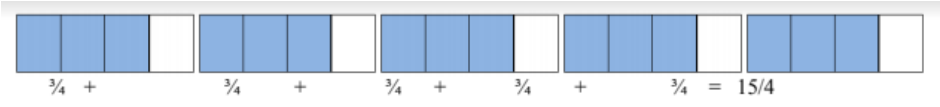
Examples of Strategies:

Students will build on their understanding of fractions from 3rd grade to make sense of larger fractions when adding, subtracting and equivalence. They are expected to use a variety of models to support their reasoning about numbers.

- Fraction bars
- Number line
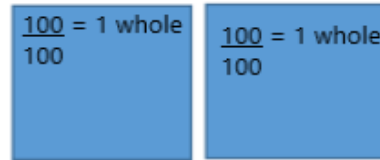- Grid models
- Pattern blocks
- Area model

Students will build on their understanding of fractions from 3rd grade to make sense of decimals when comparing their equivalency. They are expected to use a variety of models to support their reasoning about numbers.

- Fraction bars and circles
- Place value chart
- Number line
- Grid models
- Ruler/meter stick

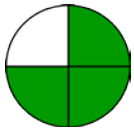| Strategies	Examples
Students will use models to add and subtract fractions.	$5/12 - 4/12 =$ 3/12 + 4/12 = 7/12
Students will use models to multiplication of a fraction by a whole number.	¼ x 7= 7/4 or 1 ¾ 0 ¼ 2/4 ¾ 4/4 5/4 6/4 7/4 1 1 ¼ 1 2/4 1 3/4 $5 \times ¾ =$ ¾ + ¾ + ¾ + ¾ + ¾ = 15/4
By decomposing larger fractions into smaller fractions, students develop conceptual understanding and flexibility in their thinking in order to add and subtract.	$$1\tfrac{2}{3} + \tfrac{2}{3}$$ $$\tfrac{3}{3} + \tfrac{2}{3} + \tfrac{2}{3} = \tfrac{7}{3}$$
Decimal Place Value Understanding	<table><tr><th>Decimal</th><th>Fraction</th><th>Place Value</th></tr><tr><td>0.2</td><td>2/10</td><td>2 tenths</td></tr><tr><td>1.43</td><td>143/100</td><td>1 and 43 hundredths</td></tr></table>

Adding Decimals	2.3 + 2.89 = 5.19
	$\frac{100}{100}$ = 1 whole $\quad$ $\frac{100}{100}$ = 1 whole $\qquad$ Each stick represents 1/10 or 10/100 for a total of 3/10 or 30/100.
	Each one represents 1/100

Important Vocabulary:

3 → **Numerator**- The top number in a fraction that represents how many parts of a whole are being considered.

4 → **Denominator**- The bottom number in a fraction that tells the total number of parts in the whole.

Equivalent- Fractions that have the same value.

Common Student Misconceptions:

Students often think that the equal-sized pieces must look the same. When given models like these, students do not think the fractional parts are equivalent, when, in fact, they are.

Students often do not consider the size of the whole when dealing with fractions. All halves are not equivalent! The size of the whole determines the size of the fraction.

$$\frac{3}{10} + \frac{2}{10} \neq \frac{5}{20}$$

When adding fractions, students will add both the numerators and the denominators, forgetting that the denominator only indicates the size of the pieces, not the number of pieces that need to be added.

Video Support:

Video support can be found on The WCPSS Academics YouTube Channel.
http://tinyurl.com/WCPSSAcademicsYouTube

- Adding and Subtracting Fractions 1
- Adding and Subtracting Fractions 2
- Adding and Subtracting Fractions 3
- Adding and Subtracting Fractions 4
- Multiply Fraction by Whole Number 1
- Multiply Fraction by Whole Number 2

Additional Resources:
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Questions to Ask When Helping Your Child with Math Homework

Keep in mind that homework in elementary schools is designed as practice. If your child is having problems, please let the classroom teacher know. When helping your child with his/her math homework, you don't have to know all the answers! Instead, we encourage you to ask probing questions so your child can work through the challenges independently. Some examples may include the following:
- What is the problem you're working on?
- What do the directions say?
- What do you already know that can help you solve the problem?
- What have you done so far and where are you stuck?
- Where can we find help in your notes?
- Are there manipulatives, pictures, or models that would help?
- Can you explain what you did in class today?
- Did your teacher work examples that you could use?
- Can you go onto another problem & come back to this one later?
- Can you mark this problem so you can ask the teacher for an explanation tomorrow?