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: Using Models to Multiply and Divide of Whole Numbers, Decimals, and Fractions

North Carolina Content State Standards:

NC.5.MD.1 Given a conversion chart, use multiplicative reasoning to solve one-step conversion problems within a given measurement system.

NC.5.NBT.5 Demonstrate fluency with the multiplication of two whole numbers up to a three-digit number by a two-digit number using the standard algorithm.

NC.5.NBT.6 Find quotients with remainders when dividing whole numbers with up to four-digit dividends and two-digit divisors using rectangular arrays, area models, repeated subtraction, partial quotients, and/or the relationship between multiplication and division. Use models to make connections and develop the algorithm.

NC.5.NBT.7 Compute and solve real-world problems with multi-digit whole numbers and decimal numbers.
- ~~Add and subtract decimals to thousandths using models, drawings or strategies based on place value.~~
- Multiply decimals with a product to thousandths using models, drawings, or strategies based on place value.
- Divide a whole number by a decimal and divide a decimal by a whole number, using repeated subtraction or area models. Decimals should be limited to hundredths.
- Use estimation strategies to assess reasonableness of answers.

NC.5.NF.4
Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction, including mixed numbers.
- Use area and length models to multiply two fractions with the denominators 2, 3, 4.
- Explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number and when multiplying a given number by a fraction less than 1 results in a product smaller than the given number.
- Solve one-step word problems involving multiplication of fractions using models to develop the algorithm.

NC.5.NF.7
Solve one-step word problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions using area and length models, and equations to represent the problem.

NC.5.OA.2 Write, explain, and evaluate numerical expressions involving the four operations to solve up to two-step problems. Include expressions involving:
- Parentheses, using the order of operations.
- Commutative, associative and distributive properties.

Wake County Public Schools, Mathematics Unit Overview for Parents
This document should not replace on-going communication between teachers & parents.

Math Language:

- Multiplication
- Partial Products
- Area Model
- Stacking Method
- Number Line

- Product
- Partial Quotients
- Distributive Property
- Base Ten Grids
- Standard Algorithm

- Division
- Divisor
- Remainder
- Estimate
- Regroup

- Quotient
- Dividend
- Estimate
- Decimal

Unit Overview:

This unit focuses on building fluency with multiplication and division of whole numbers, fractions, and decimals, through word problems and rich tasks, including measurement contexts. Students multiply two whole numbers up to a three-digit number by a two-digit number with strategies for multiplication. Then students apply their conceptual understanding of the strategies to help understand and use the standard algorithm. They begin to develop the standard algorithm for division by connecting to the models and strategies used.

Students will apply their knowledge of multiplication and division of whole numbers to make connections to the multiplication and division of decimals. Students will work to multiply decimals with a product to thousandths using models, drawings, or strategies based on place value. They will divide a whole number by a decimal and divide a decimal by a whole number, using repeated subtraction or area models. Decimals will be limited to hundredths. Finally, they will use estimation strategies to assess reasonableness of answers.

Students will also apply their knowledge of multiplication of whole numbers to fractions. Students will realize that the multiplication of a fraction by a whole number can also be represented as repeated addition, for example 2 x 1⁄4 = 1⁄4 + 1⁄4. Students will learn to multiply a fraction by a fraction using area and length models, limited to the denominators 2, 3, and 4. Students will build upon the meaning of multiplication to reason about why multiplying a given number by a fraction greater than 1 results in a product greater than the given number, and when multiplying a given number by a fraction less than 1 results in a product smaller than the given number. This is the first time that students will be dividing with fractions. Students will work with story contexts where a unit fraction (a fraction with a numerator of 1) is divided by a whole number (example: 1⁄4 ÷ 3). Students are expected to use various fraction models to solve problems. Students are required to create story contexts and visual fraction models for division situations where a whole number is being divided by a unit fraction (example: 5 ÷ 1⁄2).

Finally, students will use a conversion chart to solve conversion problems within a given measurement system, making sense of size and quantity of units in relation to the conversions to judge the reasonableness of their solutions.

Skills/Strategies:

Students will be able to:

- Solve one-step conversion problems within a given system using multiplicative reasoning based on a conversion chart
- Multiply two whole numbers up to 3-digit by 2-digit whole numbers using strategies and the standard algorithm
- Use area models, repeated subtraction, and partial quotients to divide whole numbers with remainders
- Solve real-world multiplication problems involving multi-digit whole numbers and decimal numbers with a product to the thousandths (using models, drawings, or strategies based on place value)

- Solve real-world division problems involving dividing a whole number by a decimal and a decimal by a whole number (using repeated subtraction and area models), where the decimals are limited to the hundredths
- Use area and length models to multiply a whole number by a fraction, including mixed numbers
- Use area and length models to solve one-step word problems involving the division of unit fractions by non-zero whole numbers and whole numbers by unit fractions
- Write equations to represent division of whole numbers by unit fractions, and unit fractions by whole numbers
- Write, explain, and evaluate numerical expressions with up to two steps using the four operations

Strategies that Students Will Learn:
Students will use the following models to solve multiplication and division problems with whole numbers and use these models to explain their reasoning:
- Area models
- Number lines
- Base ten blocks and drawings
- Partial products
- Expanded notation
- Standard Algorithm
- Relationship between multiplication and division
- Other drawings/pictures

Students will use the following models to solve multiplication and division problems with whole numbers decimals and use these models to explain their reasoning:
- Area models
- Number Lines
- Place Value
- Base Ten Grids & Drawings
- Other drawings/pictures

Multiplication of Decimals

Number Line Model	0.7 x 4 = .28

Use an area model to break apart unknown facts	**0.25 x 6** 6 0.20 **6 x 0.20 = 1.2** **1.2 + 0.3 = 1.5** **0.25 x 6 = 1.5** 0.05 **6 x 0.05 = 0.3**
Break apart numbers by their place value	0.4 x 0.15 0.4 x (0.10 + 0.05) 0.4 x 0.10 = **0.04** 0.4 x 0.05 = **0.020** **0.04 + 0.020 = 0.06**
Base Ten Grids and Drawings	0.18 x 4 = __0.72__ Model 0.3 x 0.4 by finding 0.3 of 0.4. There are 4 tenths modeled (each rod represents one tenth). I colored 3 tenths of each rod for a total of 12 hundredths or .12. So .3 x .4 is .12.

4.5 x 3.5 = 15.75

To solve the problem, I drew an area model and showed the partial products:
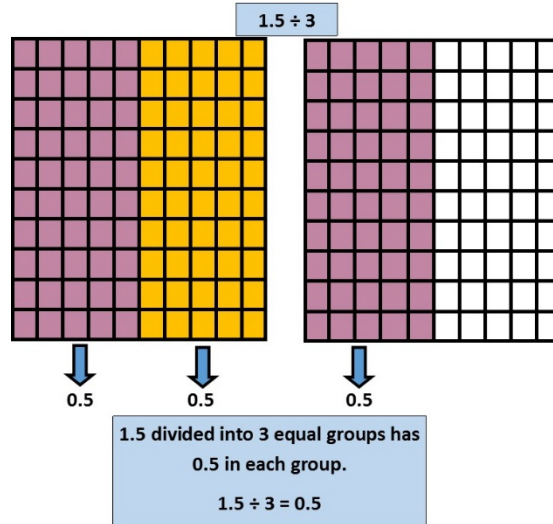
0.5 x 0.5 is 0.25
0.5 x 3 is 1.5
4 x 0.5 is 2.0
4 x 3 is 12

Division of Decimals

| Use an area model to show partitioning of a quantity | |

Use a fair sharing model to find the number in each group or share	**1.5 ÷ 3** 0.5 0.5 0.5 1.5 divided into 3 equal groups has 0.5 in each group. 1.5 ÷ 3 = 0.5

Students will use visual fraction models to represent multiplication using fractions:
- Number lines
- Fraction bars
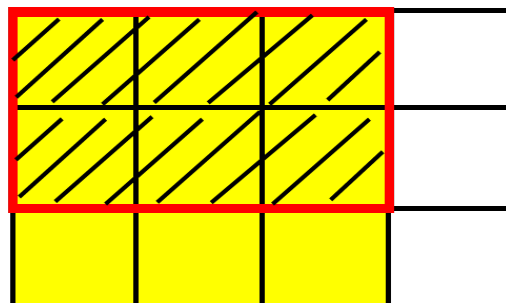- Pictorial representations/ drawings
- Color tiles

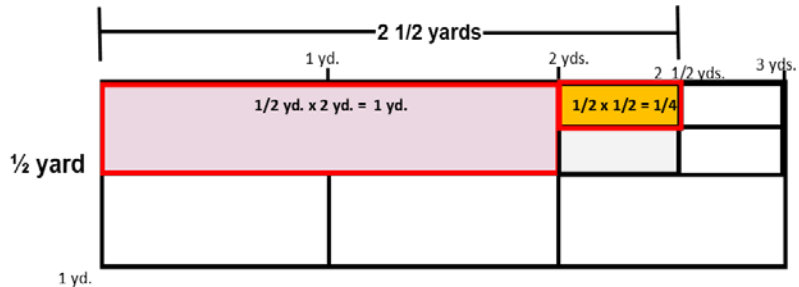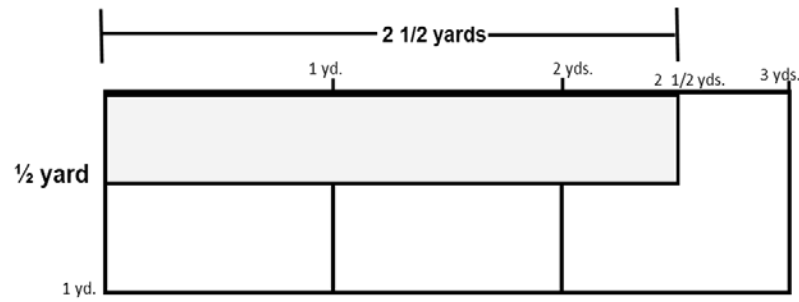|	
Grids Fraction x Fraction	Mr. Dawson planted a garden. Three-fourths of his garden was planted with corn. Two-thirds of that three-fourths was harvested. How much of the garden was harvested? **3/4 of the garden is planted with corn.** **2/3 of the corn was harvested.** $\frac{1}{2}$ of Mr. Dawson's garden has been harvested. $\frac{2}{3} \times \frac{3}{4} = \frac{6}{12} = \frac{1}{2}$
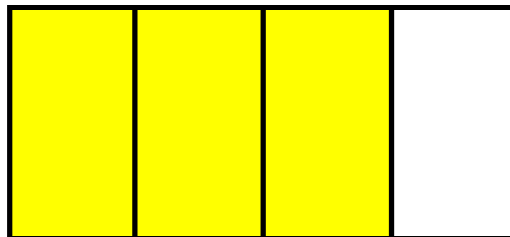
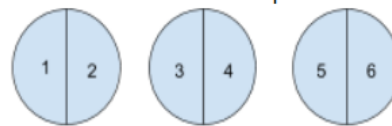| Fraction x Mixed Number	Mr. Dawson decided to build a flower box for his wife. He built it to be 2 ½ yards long and ½ yards wide. What is the area of his flower box?
	2 1/2 yards — 1 yd. — 2 yds. — 2 1/2 yds. — 3 yds.
	½ yard — 1 yd.
	2 1/2 yards — 1 yd. — 2 yds. — 2 1/2 yds. — 3 yds.
	1/2 yd. x 2 yd. = 1 yd. 1/2 x 1/2 = 1/4
	½ yard — 1 yd.
	½ x 2 yd. = 1 yd. ½ x ½ yd. = ¼ yd. 1 yd. + ¼ yd. = 1 ¼ yd.

Students will use various fraction models to show their work with dividing fractions.
- Pictorial representations/ drawings
- Number lines

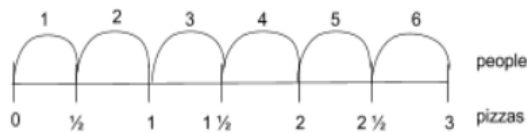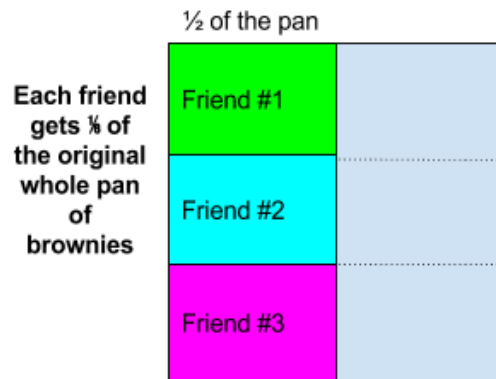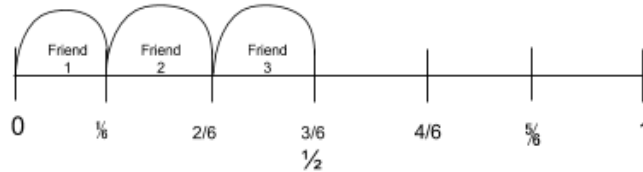| Whole Number ÷ Fraction	There are 3 pizzas. If each person gets ½ of a pizza, how many people can have pizza?
	1 2 3 4 5 6
	÷ 3 ½ = 6
	6 people could have pizza.
	1 2 3 4 5 6 people
	0 ½ 1 1½ 2 2½ 3 pizzas

Fraction ÷ Whole Number	There is ½ of a pan of brownies left from a party at school. If 3 friends share the leftover brownies, how much will each friend get?

½ of the pan

Each friend gets ⅙ of the original whole pan of brownies

Friend #1

Friend #2

Friend #3

½ ÷ 3 = ⅙
Each friend gets ⅙ of the original pan of brownies.

Friend 1 Friend 2 Friend 3

0   ⅙   2/6   3/6   4/6   ⅚   1
                    ½

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

- ES 5 Math Whole Number Multiplication with Area Model
- ES 5 Math Whole Number Division with Rectangle & Expanded Notation
- ES 5 Math Whole Number Division with Base Ten Blocks
- ES 5 Math Decimal X Whole Number w/Grids
- ES 5 Math Decimal X Whole Number w/Grids Video 2
- ES 5 Math Decimal X Whole with Number Lines
- ES 5 Math Decimal X Whole with Number Lines Video 2
- ES 5 Math Decimal X Decimal w/ Area Model
- ES 5 Math Decimal X Decimal w/ Base Ten Blocks
- ES 5 Math Decimal X Decimal w/ Number Lines
- ES 5 Math Multiply Fraction X Whole w/ Number Lines
- ES 5 Math Multiply Non-Unit Fraction X Whole w/ Number Lines
- ES 5 Math Multiply Fraction X Whole with Area Models
- ES 5 Math Multiply Fraction X Fraction using Area Models
- ES 5 Math Multiply Fraction X Fraction using Number Lines
- ES 5 Math Multiply Fraction X Fraction with Visual Fraction Models
- ES 5 Math Multiply Mixed Numbers using Area Models
- ES 5 Math Multiply Mixed Numbers by Decomposing
- ES 5 Math Divide Unit Fraction by Whole Number
- ES 5 Math Divide Whole Number by Unit Fraction

Additional Resources:

- [NCDPI Additional Resources](#)

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?