DUVAL Math Parent Tips

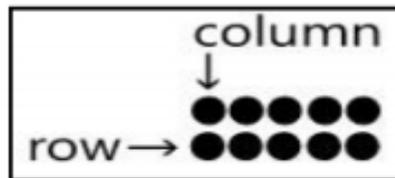DUVAL COUNTY
PUBLIC SCHOOLS

Properties of Multiplication and Division and Solving Problems with Units of 2–5 and 10

Properties of Multiplication and Division and Solving Problems with Units of 2–5 and 10: This module begins the year by building on students' fluency with addition and knowledge of arrays. They initially use repeated addition to find the total from a number of equal groups. As students notice patterns, they let go of longer addition sentences in favor of more efficient multiplication facts.

Third Grade, Module 1

Special points of interest:

✓ Multiplication & Division

✓ Words to Know

✓ Sample Problems

✓ Arrays

✓ Commutative Property

✓ Examples

✓ Help at home

✓ Standards for Mathematical Practice

✓ Florida Standards

Words to Know

Array—repeated rows of numbers or objects

Multiply—an operation showing how many times a number is added to itself.

Factor—number of groups and the number in each group

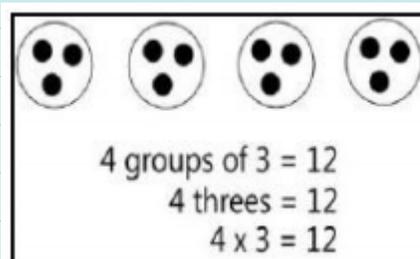**Equation—**a statement that two expressions are equal, for example 5x4 = 20

Divide—separate into equal groups

Students will be introduced to multiplication with the concept of repeated addition.

3+3+3+3 = 12

4 groups of 3 = 12
4 threes = 12
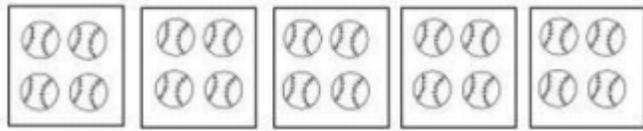4 x 3 = 12

Questions?

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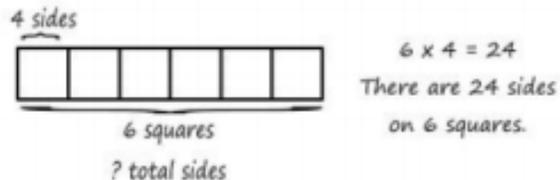
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Sample Problems

Ryan divides 20 baseballs equally between 5 boxes. Draw the baseballs in the boxes.

There are __4__ baseballs in each box. 20 divided by 5 equals __4__.

Find the number of sides on 6 squares.

4 sides

6 squares

? total sides

6 x 4 = 24
There are 24 sides
on 6 squares.

We know there are 4 sides on a square and we have 6 squares. The tape diagram is labeled with all of the information given in the word problem. We are looking for the total number of sides in 6 squares, so we will multiply to find the answer.

Arrays & Commutative Property

Students will also begin to explore the use of smaller facts to solve a larger fact by using arrays. This array shows how dividing the problem into two smaller factors can make it easier to solve. Students already know 5 x 4 and 2 x 4. So they know 7 x 4.

$6 \times 4 = 24$ and $4 \times 6 = 24$

$6 \times 4 = 4 \times 6$

Third graders are introduced to the commutative property. They will gain an understanding that the commutative property means that when multiplying, the factors can change places, but the total does not change.

7 x 4 = ____

(5 x 4) = _20_

(2 x 4) = _8_

(7 x 4) = (5 x 4) + (2 x 4)

= _20_ + _8_

= _28_
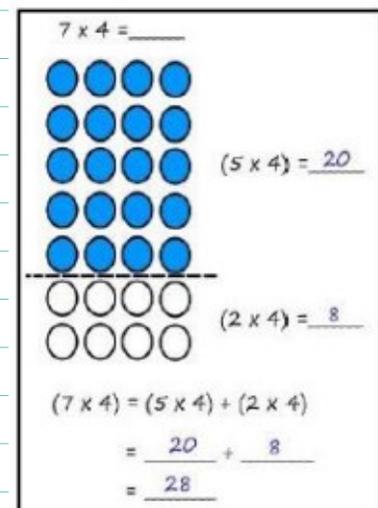
Ms. Nola has 12 apples. She puts 3 apples in each bag. How many bags does she have?

At first, students solved word problems with an array. Next they will relate an array to a tape diagram. Students will draw the array and place a box around it. Ms. Nola puts 3 apples in each bag. Students will separate the array to show 3 apples in each bag. The next step is to label the known and unknown parts of the word problem. The word problem states there are 12 apples. The entire tape diagram is equal to 12 apples. The diagram is labeled 12 apples. For every 1 bag there are 3 apples. The first rectangle represents 3 apples or 1 bag of apples. The information that is unknown is the number of bags Ms. Cara has, which is labeled with a question mark.

The goal of DUVAL Math is to produce students who are not merely literate, but fluent, in mathematics. Your child has an exciting year of discovering the story of mathematics ahead!
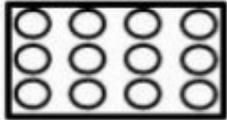
The distributive property says that multiplying a number by a group of numbers added together is the same as doing each multiplication separately.

$$5 \times 5 = (3 + 2) \times 5$$
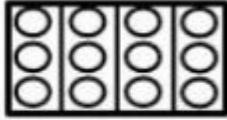$$= (3 \times 5) + (2 \times 5)$$
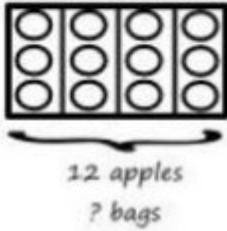$$= 15 + 10$$
$$= 25$$

draw an array
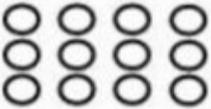
box the array

divide into bags

label known and unknown

3 apples, 1 bag

12 apples
? bags

$12 \div 3 = 4$ bags

How can you help at home?

Make arrays out of household items (e.g., pennies, beans, blocks). Determine how many items are on each row. • Select multiplication or division facts to illustrate or write a word problem. • Hunt for multiple sets of objects in the home. Use repeated addition and multiplication to find the totals. • Sort coins according to type, count the number of coins and then multiply to find the total value of pennies (x 1), nickels (x 5), dimes (x 10) and quarters (x 25). • Roll 2 number cubes. Find the products of the factors. • Count quantities of items by 2's, 3's, 5's, and 10's. • Roll 2 number cubes to determine the factors. Make an array to find the product. • Act out division problems with counters. For example, Brad has 12 rabbits. He puts the same number of rabbits into each of 4 cages. How many rabbits does Brad put in each cage? • Roll 2 number cubes and write the fact families. For example, for rolls of 4 and 6, write: 4 X 6 = 24, 6 X 4 = 24, • Ask your child to find the missing factor. For example, 5 X what number? = 35?
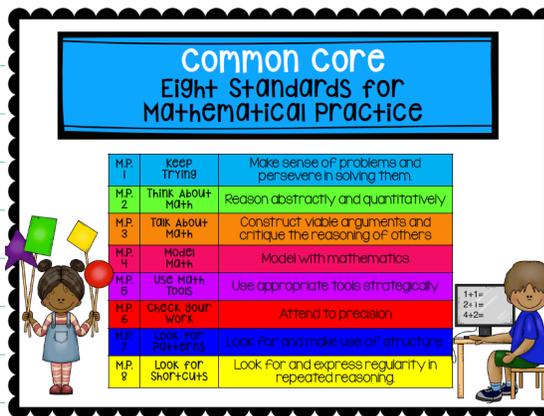
Standards for Mathematical Practice

During the first 10 days of schools, teachers will emphasize the importance of the 8 Standards for mathematical practice through 30 minute lessons.

These practices will be embedded in lessons daily throughout the school year.

Strength with the mathematical practices make strong mathematicians!

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Common Core Eight Standards for Mathematical Practice

M.P. 1	Keep Trying	Make sense of problems and persevere in solving them.
M.P. 2	Think About Math	Reason abstractly and quantitatively
M.P. 3	Talk About Math	Construct viable arguments and critique the reasoning of others
M.P. 4	Model Math	Model with mathematics
M.P. 5	Use Math Tools	Use appropriate tools strategically
M.P. 6	Check your Work	Attend to precision
M.P. 7	Look for Patterns	Look for and make use of structure
M.P. 8	Look for Shortcuts	Look for and express regularity in repeated reasoning

Mathematics Florida Standards

Represent and solve problems involving multiplication and division.1

3.OA.1.1 Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 × 7.

3.OA.1.2 Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.

3.OA.1.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. (See Glossary, Table 2.)

3.OA.1.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = _ ÷ 3, 6 × 6 = ?

Understand properties of multiplication and the relationship between multiplication and division.2

3.OA.2.5 Apply properties of operations as strategies to multiply and divide. (Students need not use formal terms for these properties.) Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)3

3.OA.2.6 Understand division as an unknown-factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.

3.OA.3.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

Solve problems involving the four operations, and identify and explain patterns in arithmetic.5

3.OA.4.8 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (This standard is limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order, i.e., Order of Operations.)