

FAMILY MATH

Conceptual Understanding of Multiplication

Dear Family,

Your student is making sense of multiplication by connecting it to addition. Instead of repeatedly adding the same number, they recognize that multiplying can be more efficient. They create representations of multiplication in equal groups or arrays by using cubes or drawing pictures. Then they write multiplication equations to match. For now, the factors are limited to 2, 3, 4, 5, and 10 as your student builds their understanding of multiplication.

Key Terms and Symbols

factor

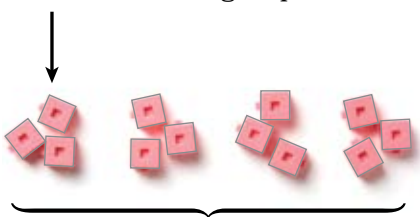
multiplication

multiplication symbol $\times$

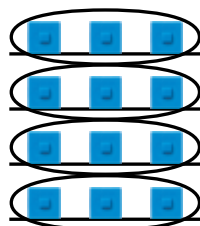
multiply

product

Number in each group: 3



Number of groups: 4

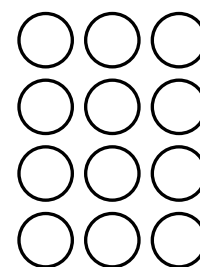


$$3 + 3 + 3 + 3 = 12$$

$$4 \text{ threes} = 12$$

$$4 \times 3 = 12$$

Draw an array to show 4 rows of 3.



$$4 \times 3 = 12$$

factor

factor

product

At-Home Activities

How Can You Make Equal Groups?

Gather groups of everyday objects from around your home such as toy cars, crackers, or beads. Together with your student, arrange the objects into equal groups or arrays. Ask them to write or say a multiplication equation to represent the groups of objects. Encourage skip-counting to figure out the product.

Equal Groups and Arrays at the Grocery Store

Look for items packaged in equal groups and arrays, such as eggs, hamburger buns, or toilet paper. Discuss with your student the number of groups and the number in each group for each situation. Then have them use multiplication to find the total in each package.

FAMILY MATH

Conceptual Understanding of Division

Dear Family,

Your student is exploring how multiplication connects to division. They represent real-world division situations with equal-groups models, arrays, and equations using the division symbol. Sometimes the total and the *number of groups* are known, and sometimes the total and the *number in each group* are known.

Key Terms and Symbols

divide

division

division symbol $\div$

Share 10 crackers.



2 equal groups of
5 crackers

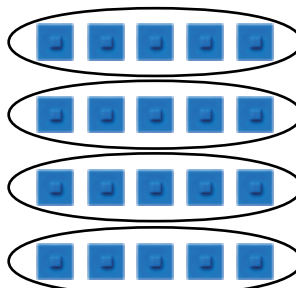


5 equal groups of
2 crackers

Mia puts **10** pencils into equal groups. She puts **2** pencils in each group. How many equal groups of pencils are there?



There are 5 equal groups.



$$20 \div 5 = 4$$

total number number
 in each of rows
 row

At-Home Activity

Everyday Division

Look for opportunities to practice division situations at home.

- While making snacks, invite your student to help share the food equally among those sharing the snack. For example, ask, “If we have 15 apple slices to share equally among 3 people, how many apple slices will each person get?”
- While playing with toy cars or building blocks, invite your student to make an array with the objects to match a division equation. For example, write $15 \div 3 = 5$. Together with your student, arrange 15 blocks into an array with 3 rows. Then have them explain where they see each part of the division equation in the array.

FAMILY MATH

Properties of Multiplication

Dear Family,

Your student is exploring strategies to multiply with large factors. They learn that they can rotate an array and skip-count either by rows or columns and the total stays the same. Another strategy involves breaking the array into two smaller, simpler multiplication problems and then adding the totals.

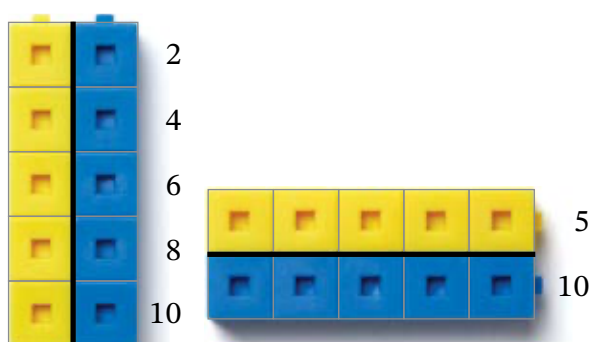
Key Terms and Symbols

break apart and distribute strategy

commutative property of multiplication

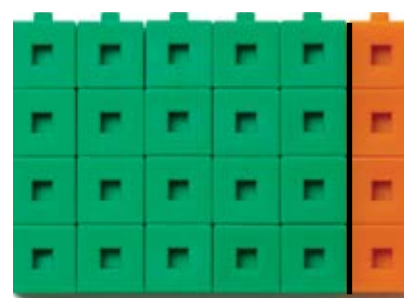
parentheses ()

rotate



$$\begin{aligned} 5 \times 2 &= 10 \\ 2 \times 5 &= 10 \end{aligned}$$

Rotating an array helps to show that the order of the factors can change without changing the product. This is called the commutative property of multiplication.



$$\begin{aligned} 5 \text{ fours} &+ 1 \text{ four} = 6 \text{ fours} \\ (5 \times 4) &+ (1 \times 4) = (6 \times 4) \\ 20 &+ 4 = 24 \end{aligned}$$

When the factors are large or unfamiliar, breaking the array apart into smaller and more familiar multiplication facts can make the total easier to find. Students call this the break apart and distribute strategy.

At-Home Activity

Tile Multiplication

If you have a wall or floor with square tiles, use chalk, masking tape, or another similar material to draw an outline around an array of tiles. With your student, discuss different strategies for counting the total number of tiles inside the array. Write down or say the multiplication equations to match. Then look at the array from another angle to notice other ways to count the tiles. Consider splitting the original array into smaller arrays to notice more strategies for finding the total number of tiles.

Instead of tiles, you could draw an array of squares outside with sidewalk chalk or create an array with square sticky notes to complete the activity.

FAMILY MATH

Two Interpretations of Division

Dear Family,

Your student continues to deepen their understanding of equal groups. They relate finding an unknown factor in multiplication to finding the quotient, the answer in a division problem.

Drawing equal groups and arrays helps to represent the situation when finding either the size of each group or the number of groups. Tape diagrams can also help to identify what is known and what is unknown.

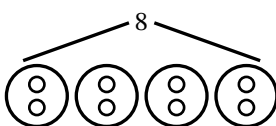
Key Term
quotient

Eva puts flowers into vases.

She has 8 flowers.

She puts 2 flowers in each vase.

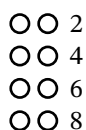
How many vases have flowers?



$$8 \div 2 = \boxed{4}$$

4 vases have flowers.

equal groups model



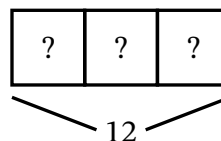
$$\boxed{4} \times 2 = 8$$

4 vases have flowers.

array model

12 apples are placed equally into 3 bags.

How many apples are in each bag?



$$12 \div 3 = \underline{\hspace{2cm}}$$

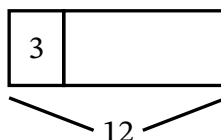
The unknown in both equations is the number of groups.

This tape diagram shows that the total and number of groups are known, but the size of each group is unknown.

12 apples are placed equally into bags.

There are 3 apples in each bag.

How many bags of apples are there?



$$3 \times \underline{\hspace{2cm}} = 12$$

This tape diagram shows that the total and the size of each group are known, but the number of groups is unknown.

At-Home Activity

Two Types of Everyday Division

Look for opportunities to discuss different types of division in everyday life.

- Count the total number of socks in a drawer and ask your student how many pairs there are when there are 2 socks in each pair. Discuss why 2 is the size of the group in this situation.
- Select 9 shirts. Ask your student how many should go in each pile if you want to make 3 equal piles. Discuss why 3 is the number of groups in this situation.

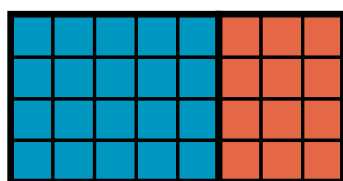
Ask your student, “What equation can help you solve the problem?” For example, if there are 8 socks total and 2 socks in each pair, the division equation is $8 \div 2 = \underline{\hspace{1cm}}$ and the unknown factor equation is $\underline{\hspace{1cm}} \times 2 = 8$.

FAMILY MATH

Application of Multiplication and Division Concepts

Dear Family,

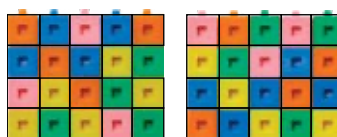
Your student is using the familiar break apart and distribute strategy to solve more challenging problems, including two-step word problems. They explore different ways of breaking apart problems into smaller or familiar parts. These parts can be simpler to work with and result in the same answer. In multiplication, breaking apart a factor into smaller parts to make simpler problems uses the associative and distributive properties. However, your student does not name these properties until grade 4. Instead, they use arrays and write equations to describe the strategies.



$$32 \div 4 = 5 + 3 = 8$$

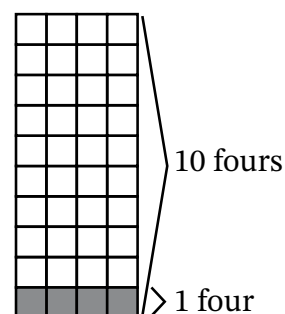
$\wedge$
 20 12

$$8 \times 5 = 40$$



$$4 \times 5$$

$$4 \times 5$$



$$9 \text{ fours} = 10 \text{ fours} - 1 \text{ four}$$

$$9 \times 4 = (10 \times 4) - (1 \times 4)$$

$$9 \times 4 = 40 - 4$$

$$9 \times 4 = 36$$

At-Home Activities

Fact Fluency Hide-and-Seek

Hide known multiplication and division problems around your home using the factors 2, 3, 4, 5, and 10.

- Write multiplication and division problems on brightly colored paper. Examples of problems you could write for your student are $2 \times 4 = \underline{\quad}$, $16 \div 2 = \underline{\quad}$, $5 \times \underline{\quad} = 20$, or $\underline{\quad} \times 3 = 15$.
- Hide the facts in common places where your student can find them such as inside a cupboard or on the back of a door. Have your student solve each problem. Encourage your student to use a strategy, such as break apart and distribute, to solve more challenging problems.
- Consider asking your student to write similar problems for you to solve. Ask your student to check your work.

Problem Solving

- Look for opportunities to show how multiplying and dividing is used in daily life.
- “I am making our lunches for the week. I have 15 carrot sticks and I want to put 3 in each lunch. How many lunches can I make? What if I add 6 more carrot sticks?”
- “You get 32 pieces of candy at the Fall Carnival, but you are only allowed to eat 4 pieces each day. How many days will it take to eat all the candy?”