InsightMath

Discovering Multiplication and Division

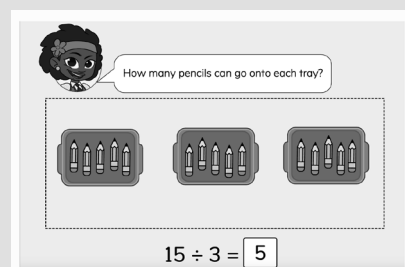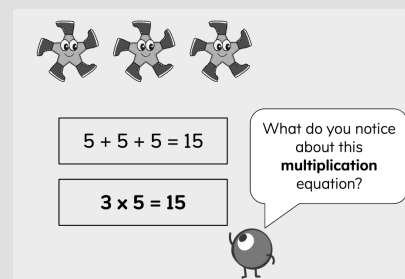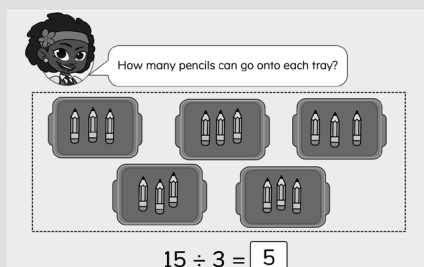Family Guide | Grade 3 | Unit 1

Your student is exploring how multiplication and division are the mathematics of equal groups.
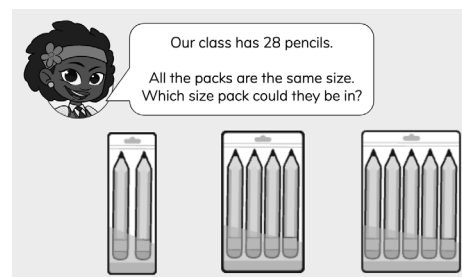
Key Math Ideas

In this unit, students are introduced to multiplication and division. Students explore finding the total number of objects in equal groups and see that adding the amounts in each group (repeated addition) is the same as using multiplication. In the example to the right, students recognize that each star wears 5 shoes, so the visual shows 3 groups of 5. Students recognize that they can represent the situation with repeated addition (5 + 5 + 5 = 15) or multiplication (3 × 5 = 15).

$5 + 5 + 5 = 15$

$3 × 5 = 15$

What do you notice about this **multiplication** equation?

Students explore division as splitting a total into equal groups. In dividing, students find either the number of groups or the number in each group. For instance, in the examples to the right, when solving 15 ÷ 3 = 5, students can think of 3 equal groups with 5 in each or 5 equal groups with 3 in each.

How many pencils can go onto each tray?

$15 ÷ 3 = \boxed{5}$

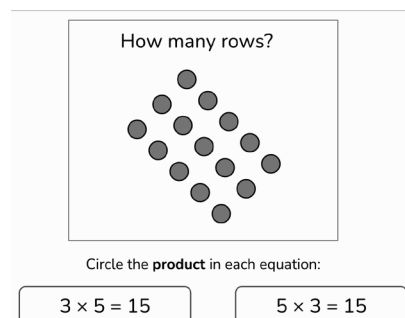How many pencils can go onto each tray?

$15 ÷ 3 = \boxed{5}$

→ **In the first half of the unit, your student will learn to**

- organize a set of objects into equal groups in more than one way;
- identify and explain situations in which equal groups cannot be made from a set of objects;
- use words and models to explain the relationship between repeated addition and multiplication of one digit numbers;
- explain division as splitting a total into equal groups to find the number of groups or the number in each group.

Our class has 28 pencils.

All the packs are the same size. Which size pack could they be in?

→ **In the second half of the unit, your student will learn to**

- create arrays to represent multiplication and division problems with equations and to solve them;
- use arrays to explain why changing the order of factors does not change the product, as shown in the example to the right where the array can be represented by 5 × 3 and 3 × 5;
- skip count by 2, 5, and 10 and use these multiples to solve problems;
- solve word problems involving multiplication and division.

How many rows?

Circle the **product** in each equation:

$3 × 5 = 15$ $5 × 3 = 15$

Helpful Hint

In this unit, when students multiply, the product will always be larger than the factors. However, this will not always be true as students progress into the upper grades! When students begin to multiply fractions and decimals, there are times when the product will be less than what they started with. To support this, try not to use phrases for multiplication like "the answer is always greater." Let students work to understand multiplication as equal groups, regardless of the size of the factors or product.

Tips for Supporting Your Student at Home

Questions to Ask Your Student

→ **In the first half of the unit:**

- How can you represent equal groups with a multiplication equation?
- How can we use equal groups to solve multiplication problems?
- What do we call it when we split a total into equal groups?
- Are you finding the number of groups or number in each group? How do you know?
- How can you write a division equation to represent the situation?

→ **In the second half of the unit:**

- How can equal groups be organized in an array to help us solve problems?
- How can we write multiplication and division equations to model arrays?
- Do you get the same result if we switch the order of numbers when we multiply? How do you know?
- How can we use what we know about multiplication and division to help us solve problems?

If...	Try...
your student has difficulty with how to solve a multiplication or division problem . . .	providing them with physical objects so they can make equal groups. You can also try asking, "Is there is a multiplication fact you know that can help find what you don't know?"

Student Strengths Spotlight

I learn from my mistakes.	Exploring new ideas can lead to mistakes, and students take this opportunity to recognize that every mistake is an opportunity to learn.
I start by observing what is happening in the problem.	Before starting to solve, students take time to understand and make sense of the problem.
I notice patterns and try to understand them.	Recognizing patterns and using them to explore new problems supports students to think flexible and in new ways.

Try This Together!

- **Multiplication in our Lives!** Look for situations in which your family uses multiples of things that are packaged in equal groups, such as juice boxes or snack packs. Ask your student to find how many there are in total. You can also ask students questions such as, "How many 6 packs of juice boxes do we need if we want 18 juice boxes?"

- **How Many Equal Groups?** Think about all the ways to make equal groups that add up to a specific amount, such as 24. Students can use multiplication or division thinking with equal groups.

- **Division in our Lives!** Look for sharing situations in which your student can make equal groups by passing out the same amount to each person. Have your student explain how to divide to make equal groups. For example, ask, "If you share 12 pencils between 5 people, how many will each person get?"

- **Creating Arrays.** Provide your students with a set of the same item, such as crackers or small erasers that are the same size. Ask your student to arrange them in an array and write a multiplication and division equation to represent their array. For example, 12 crackers could be organized in 3 rows of 4 crackers and represented with the multiplication equations $3 \times 4 = 12$ or $4 \times 3 = 12$ and the division equations $12 \div 4 = 3$ or $12 \div 3 = 4$.