5 | **Module 10**

**Core Focus**

• Decimal fractions: Multiplying and dividing

Decimal fractions: Multiplying

• In this module, students develop a broad and deep understanding of multiplication involving **decimal fractions**.

• The lessons purposefully avoid teaching rules and procedures. Students are encouraged to use and adapt what they already know about multiplying whole numbers to the new situation of multiplying decimals.

• In later years, students will learn the **standard algorithm** for multiplying decimal fractions, connecting the written method to the strategies they are learning now.

10.1 **Decimal fractions: Multiplying by a whole number**

Step In Each square represents one whole.

The shaded part shows one group of 0.2.
How could you show 4 groups of 0.2?
What about 6 × 0.2?
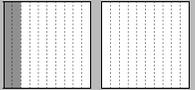
In this lesson, students multiply whole numbers by decimal fractions (tenths).

• Students are already familiar with visualizing multiplication (using shaded rectangles or number lines) and with splitting numbers into parts to make them easier to multiply piece by piece.

10.4 **Decimal fractions: Multiplying with whole numbers using partial products**

Step In A leftover roll of carpet is 5 m long and 0.42 m wide.
Marvin is thinking of using it to carpet his daughter's playhouse.

What floor area do you think the leftover carpet will cover?

The carpet would cover 5 square meters if it were 1 m wide. The carpet is a little less than $\frac{1}{2}$ that width, so it will cover half as much.

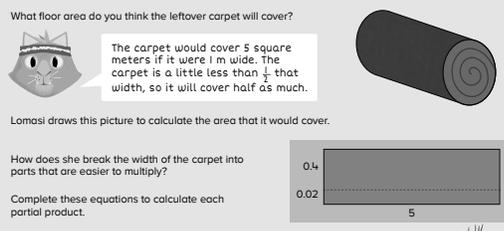Lomasi draws this picture to calculate the area that it would cover.

How does she break the width of the carpet into parts that are easier to multiply?

Complete these equations to calculate each partial product.

5 × 0.4 = ☐   5 × 0.02 = ☐

What area can the leftover carpet cover?
How would you use this strategy to calculate 6 × 0.36?

I've used this strategy before to multiply whole numbers.

In this lesson, students split a decimal fraction into tenths and hundredths to multiply the part.

Ideas for Home

• Write a basic multiplication fact such as 7 × 3 = 21. Then adjust one or more of the factors to write as many new equations as possible. E.g. your child could write 0.7 × 3 = 2.1, 0.3 × 0.7 = 0.21, and 70 × 3 = 210. Discuss how you know where to place the decimal point (e.g. 0.7 is ten times less than 7, so the answer must be ten times less).

• Look at weekly supermarket circulars and choose some favorite food items. Ask your child to figure out the price of three, four, or five items. Be sure to ask what strategy they used.

Glossary

▸ **Decimal fractions** are fractions in which the denominator is 10, 100, or 1000, etc., but are always written using decimal points.

▸ An **algorithm** is a rule used for completing tasks or solving problems.

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• The area model is the main representation used to provide meaning. The lessons rely on the work students have already completed to multiply *common fractions*. Students use the same steps to multiply 0.4 by 0.3 as they did for multiplying $\frac{4}{10}$ by $\frac{3}{10}$ in an earlier module.

In this lesson, students split a decimal fraction into tenths and hundredths to multiply the parts.

Decimal fractions: Dividing

• Students begin to divide by decimal fractions. Students use real-world examples to solve problems involving sharing. They write equations to match the problems with the quotient or the divisor as a decimal fraction. Language such as "How many four tenths are there in 2 wholes?" is used to help interpret the latter sentence.

• The connection between division and multiplication is also used to provide meaning.

In this lesson, students consider how to add numbers that include hundredths.

• Students rewrite a problem involving division by a decimal as an equivalent problem where the divisor is a whole number to make the division easier. For example, 0.9 ÷ 0.3 can be rewritten as 9 ÷ 3, so the answer is 3. Multiplying both numbers in a division problem by the same number creates an equivalent equation. Language again plays an important role when exploring tenths divided by tenths.

Ideas for Home

• Restaurant menus provide a great opportunity for your child to practice with decimal fractions. Ask them to find the total price of two or three items, then find the cost per person if the items are shared by 2 or 3 people. There may be a few cents left over.

• Use everyday experiences such as cooking (mass or capacity) to create and solve situations involving division. E.g. if a dozen eggs weigh 0.72 kg, how much would one egg weigh?