

# 3.4

## Multiplying Decimals

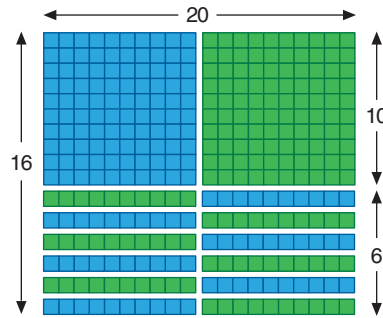
**Focus**

Use Base Ten Blocks, paper and pencil, and calculators to multiply decimals.

Recall how to multiply 2 whole numbers using Base Ten Blocks.

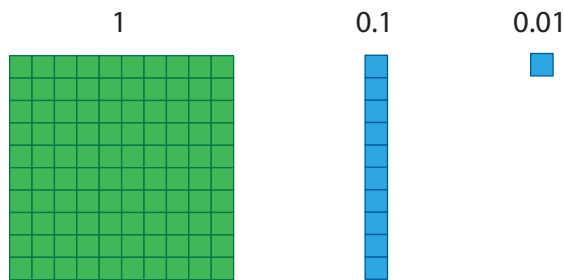
This picture shows the product:

$$20 \times 16 = 100 + 100 + 60 + 60 = 320$$



We can also use Base Ten Blocks to multiply 2 decimals.

Let the flat represent 1, the rod represent 0.1, and the small cube represent 0.01.



### Explore



You will need Base Ten Blocks and grid paper. Use Base Ten Blocks to model a rectangular patio with area greater than 4 m<sup>2</sup> and less than 6 m<sup>2</sup>. Let the side length of the flat represent 1 m. How many different patios can you model? Record your designs on grid paper.

### Reflect & Share

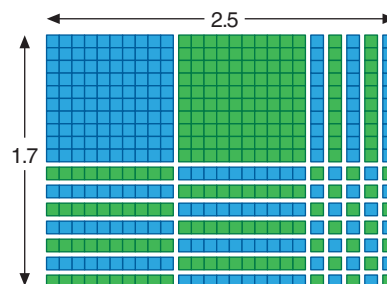
Compare your designs with those of another pair of classmates. Did you have any designs the same? Explain. Explain how your designs show the area of the patio.



## Connect

A rectangular park measures 1.7 km by 2.5 km.  
Here are 2 ways to find the area of the park.

- Use Base Ten Blocks.  
Build a rectangle with length 2.5 and width 1.7.  
Count the blocks in the rectangle.  
There are 2 flats:  $2 \times 1 = 2$   
There are 19 rods:  $19 \times 0.1 = 1.9$   
There are 35 small cubes:  $35 \times 0.01 = 0.35$   
The total area is:  $2 + 1.9 + 0.35 = 4.25$   
The total area of the park is  $4.25 \text{ km}^2$ .
- Use the method for multiplying 2 whole numbers.  
The area, in square kilometres, is  $1.7 \times 2.5$ .



Multiply:  $17 \times 25$

$$\begin{array}{r} 17 \\ \times 25 \\ \hline 85 \\ \underline{340} \\ 425 \end{array}$$

$1.7 \times 2.5$   
Think:  $1 \times 2 = 2$   
So,  $1.7 \times 2.5$  is about 2.  
Place the decimal point  
between the 4 and the 2.

Using front-end estimation to place the decimal point,  $1.7 \times 2.5 = 4.25$ .  
The area of the park is  $4.25 \text{ km}^2$ .

### Example

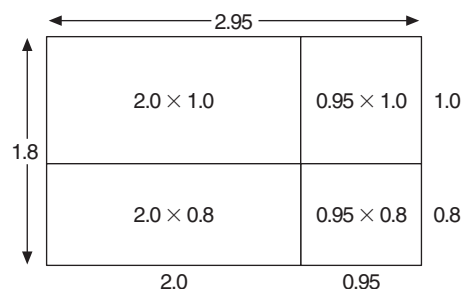
At the Farmers' Market, 1 kg of grapes costs \$2.95.  
How much would 1.8 kg of grapes cost?

### A Solution

1 kg of grapes costs \$2.95.  
So, 1.8 kg would cost:  $\$2.95 \times 1.8$   
Use a rectangle model.

$$\begin{aligned} 2.95 \times 1.8 &= (2.0 \times 1.0) + (0.95 \times 1.0) + (2.0 \times 0.8) + (0.95 \times 0.8) \\ &= (2 \times 1) + (0.95 \times 1) + (2 \times 0.8) + (0.95 \times 0.8) \\ &= 2 + 0.95 + 1.6 + 0.76 \\ &= 5.31 \end{aligned}$$

1.8 kg of grapes would cost \$5.31.



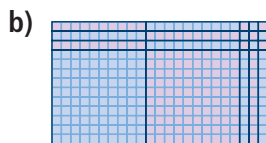
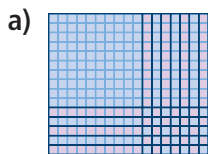
### Another Strategy

We could use a calculator to multiply.

Use a calculator when the multiplier has more than 2 digits.

## Practice

1. Write the product that each picture represents.  
Each small square represents 0.01.



2. Use Base Ten Blocks to find each product.  
Record your work on grid paper.

a)  $2.6 \times 1.5$

b)  $2.3 \times 0.4$

c)  $0.8 \times 0.7$

3. Choose one part from question 2.  
Explain how the Base Ten Blocks show the product.

4. Multiply. Use a rectangle model.

a)  $4.2 \times 3.7$

b)  $8.9 \times 0.3$

c)  $0.6 \times 0.9$

5. A rectangular plot of land measures 30.5 m by 5.3 m.  
What is the area of the plot?  
Estimate to check your answer is reasonable.



6. Multiply. Describe any patterns you see.

a)  $8.36 \times 10$

b)  $8.36 \times 0.1$

$8.36 \times 100$

$8.36 \times 0.01$

$8.36 \times 1000$

$8.36 \times 0.001$

$8.36 \times 10\,000$

$8.36 \times 0.0001$

7. **Assessment Focus** An area rug is rectangular.  
Its dimensions are 3.4 m by 2.7 m.  
Show different strategies you can use  
to find the area of the rug.  
Which strategy is best? Justify your answer.



8. Multiply.

a)  $2.7 \times 4.786$

b)  $12.52 \times 13.923$

c)  $0.986 \times 1.352$

Explain how you can check your answers.



9. The fuel consumption estimates of Josie's car are:

City: 21.2 km/L Highway: 23.3 km/L

The car's gas tank holds 40.2 L of fuel.

- a) How far could Josie drive on a full tank of gas on the highway before she runs out of fuel?  
 b) How far could she drive on a full tank of gas in the city?  
 What assumptions did you make?

10. Find the cost of each item at the Farmers' Market.

Which strategy will you use? Justify your choice.

- a) 2.56 kg of apples at \$0.95/kg  
 b) 10.5 kg of potatoes at \$1.19/kg  
 c) 0.25 kg of herbs at \$2.48/kg

11. The product of 2 decimals is 0.36.

What might the decimals be?

Find as many answers as you can.

12. a) Multiply  $18 \times 12$ .

- b) Use only the result from part a and estimation.

Find each product.

i)  $1.8 \times 12$

ii)  $18 \times 0.12$

iii)  $0.18 \times 12$

iv)  $0.18 \times 0.12$

Explain your strategies.



13. **Take It Further**

- a) Multiply.

i)  $6.3 \times 1.8$

ii)  $0.37 \times 0.26$

iii)  $3.52 \times 2.4$

iv)  $1.234 \times 0.9$

- b) Look at the questions and products in part a.

What patterns do you see in the numbers of decimal places in the question and the product?

How could you use this pattern to place the decimal point in a product without estimating?

- c) Multiply:  $2.6 \times 3.5$

Does the pattern from part b hold true?

If your answer is no, explain why not.

### Reflect

When you multiply 2 decimals, how do you know where to place the decimal point in the product? Use examples to explain.