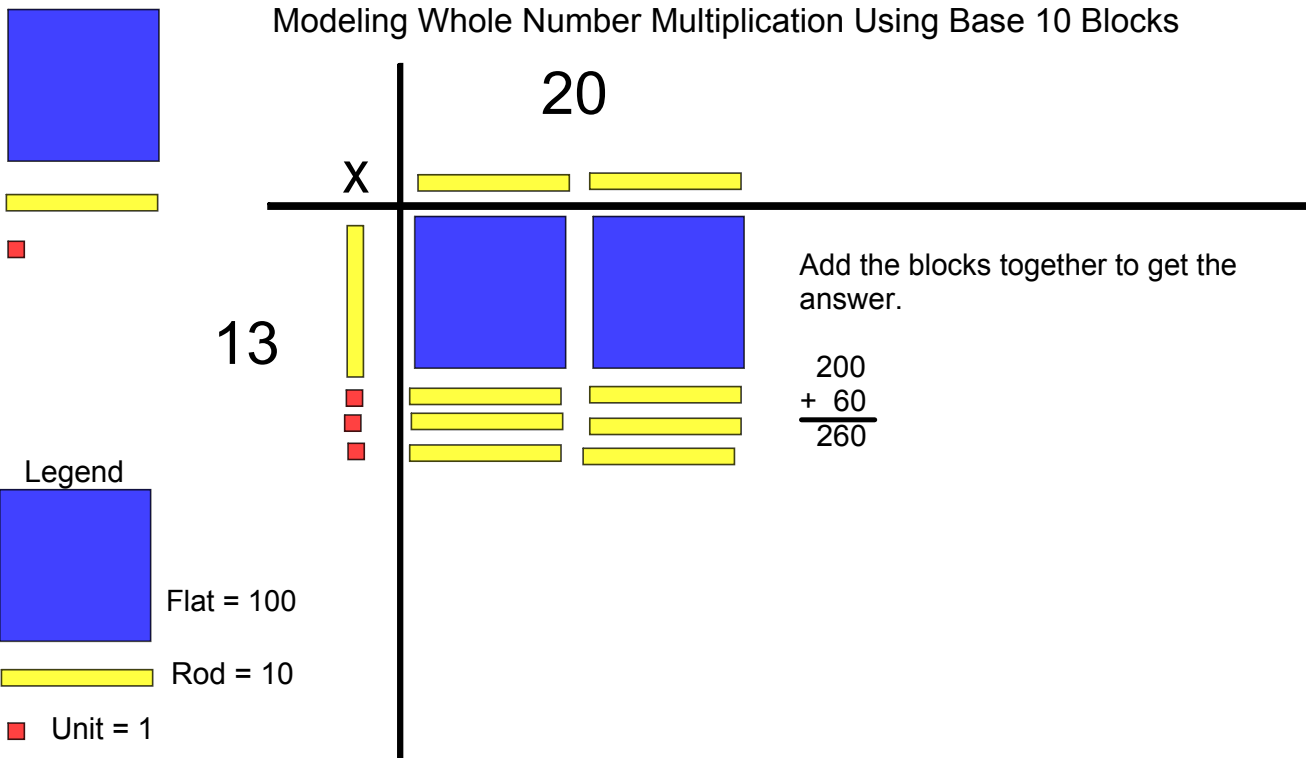


Question: How can I multiply  $23 \times 11$  using base 10 blocks?

<http://www.youtube.com/watch?v=mjYYbwuued0>





## 3.4

## Multiplying Decimals

**Focus**

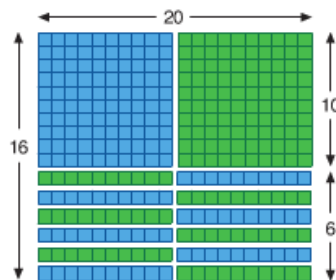
Use Base Ten Blocks, paper and pencil, and calculators to multiply decimals.

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

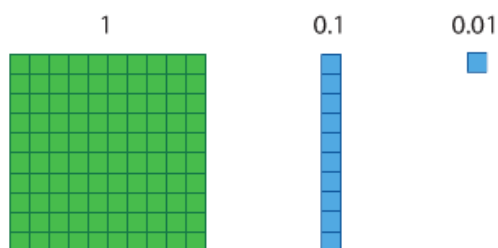
This picture shows the product:

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

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  $4 \text{ m}^2$  and less than  $6 \text{ m}^2$ .  
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**

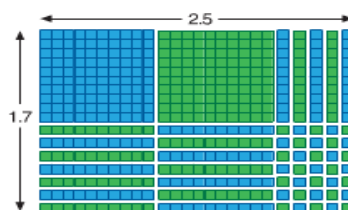
Compare your designs with those of another pair of classmates.  
Did you have any designs the same? Explain.  
Explain how your designs show the area of the patio.



### 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 km<sup>2</sup>.



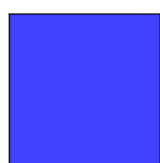
- Use the method for multiplying 2 whole numbers.  
The area, in square kilometres, is  $1.7 \times 2.5$ .  
Multiply:  $17 \times 25$

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

$1.7 \times 2.5$   
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 km<sup>2</sup>.

When multiplying decimals the value of the base 10 blocks change.



Flat = 1



Rod = 0.1



Unit = 0.01

To model the decimal 2.36 with base 10 blocks we would do the following:

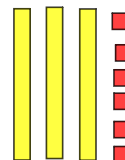
2.36



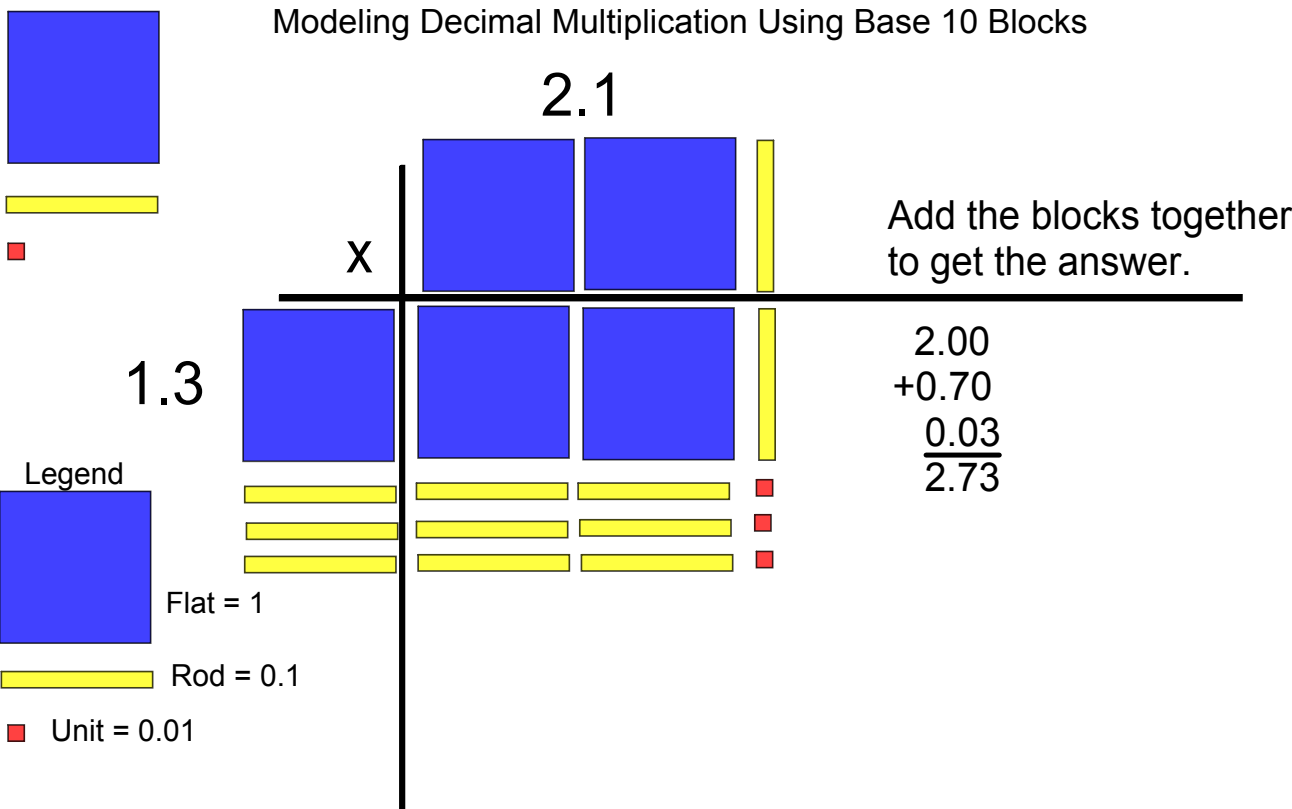
2 wholes



3 tenths

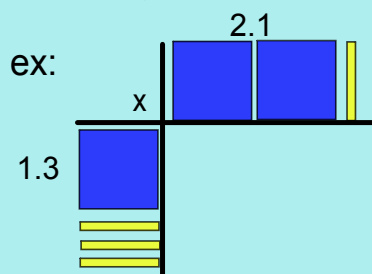


6 hundredths

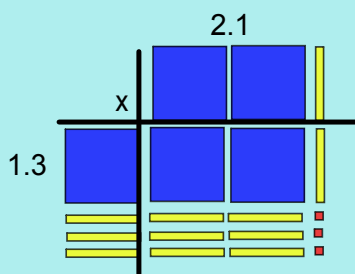


## Steps to Multiply Decimals Using Base 10 Blocks

1. Draw a grid and write one of the numbers at the top of the grid and the second number down the side. Then use the base 10 blocks to represent the decimal being multiplied.



2. Fill in the blocks under the grid so that they form a square/rectangle.



3. Add the blocks together that are inside the grid to get your answer.

$$\begin{array}{r} 2.00 \\ +0.70 \\ \hline 0.03 \\ \hline 2.73 \end{array}$$