3.5 Dividing Decimals

Recall how you used Base Ten Blocks to multiply:

Since multiplication and division are related, we can also use Base Ten Blocks to divide.

Which division sentences could you write for this diagram?
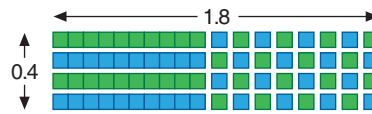
$$1.8 \times 0.4 = 0.72$$

Explore

You will need Base Ten Blocks and grid paper.
Marius bought 1.44 m of ribbon for his craft project.
He needs to cut the ribbon into 0.6-m lengths.
How many 0.6-m lengths can he cut?
Use Base Ten Blocks to find out.
Record your work on grid paper.

Reflect & Share

Compare your solution with that of another pair of classmates.
What was your strategy?
How could you use division of whole numbers to check your answer?
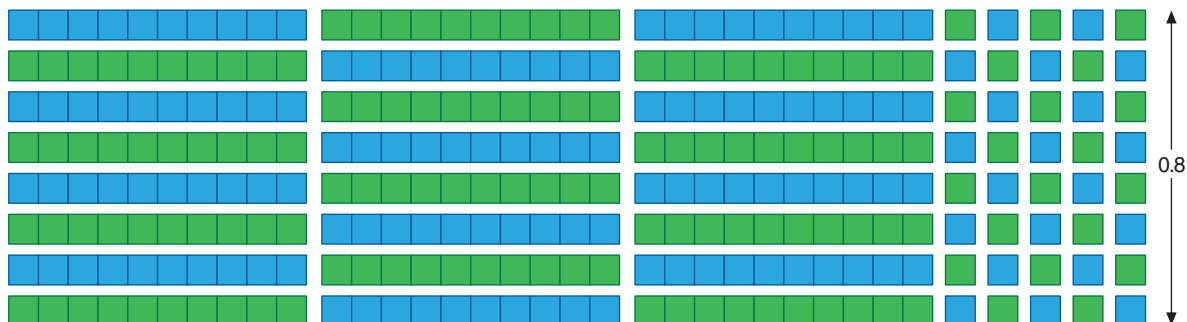
Connect

Jan bought 2.8 m of framing to make picture frames.
Each picture needs 0.8 m of frame.
How many frames can Jan make?
How much framing material is left over?

Use Base Ten Blocks to divide: $2.8 \div 0.8$
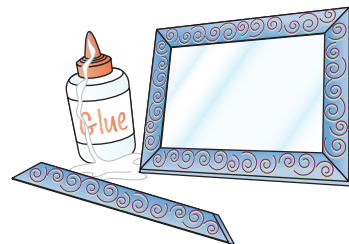
Make a rectangle with area 2.8 and width 0.8.

The length of the rectangle is 3.5.

So, Jan can make 3 frames.

3 frames use: 3×0.8 m $= 2.4$ m

So, the framing material left is: 2.8 m $-$ 2.4 m $=$ 0.4 m

Sometimes when we divide 2 decimals, the quotient is not a terminating decimal.
Then we can use paper and pencil.

Example

Divide: $52.1 \div 0.9$

A Solution

Estimate first: $52.1 \div 0.9$

Write each decimal to the nearest whole number, then divide.

$52 \div 1 = 52$

So, $52.1 \div 0.9$ is about 52.

> 52.1 is closer to 52.
> 0.9 is closer to 1.

Divide as you would whole numbers.

$521 \div 9$

$$
\begin{array}{r}
5788 \\
9\overline{)52100} \\
45 \\
\hline
71 \\
63 \\
\hline
80 \\
72 \\
\hline
80 \\
72 \\
\hline
8
\end{array}
$$

divisor ⟶ 9)52100 ⟵ dividend
5788 ⟵ quotient

> **Divide until the quotient has 2 more digits than the estimate. Then we can write the quotient to the nearest tenth.**

If the quotient is not exact, write zeros in the dividend, then continue to divide.

Since the estimate has 2 digits, divide until there are 4 digits in the quotient.

Since the estimate was 52, place the decimal point
so the quotient is close to 52: $52.1 \div 0.9 \doteq 57.88$
In the question, the dividend and divisor were given to the nearest tenth.
So, we write the quotient to the nearest tenth.
$52.1 \div 0.9 \doteq 57.90$, or 57.9

57.88 is closer to 57.90 than to 57.80.

We can use a calculator when the divisor has more than 1 digit.

Practice

1. Use Base Ten Blocks to divide. Record your work on grid paper.
   a) $0.8 \div 0.1$ b) $1.2 \div 0.3$ c) $2.7 \div 0.6$ d) $2.2 \div 0.4$

2. Divide. Describe any patterns you see.
   a) $124.5 \div 10$ b) $124.5 \div 0.1$
   $\quad 124.5 \div 100$ $\quad 124.5 \div 0.01$
   $\quad 124.5 \div 1000$ $\quad 124.5 \div 0.001$
   $\quad 124.5 \div 10\ 000$ $\quad 124.5 \div 0.0001$

3. Why do all these division statements have 6 as the answer?
   a) $30 \div 5$ b) $3.0 \div 0.5$ c) $0.3 \div 0.05$ d) $300 \div 50$
   Which one is easiest to calculate? Explain.

4. Estimate to choose the correct quotient for each division question.

Question	Possible Quotients		
a) $59.5 \div 5$	119	11.9	1.19
b) $195.3 \div 0.2$	9765	976.5	97.65
c) $31.32 \div 0.8$	3915	391.5	39.15

5. Use paper and pencil to divide.
   a) $1.5 \div 0.6$ b) $2.24 \div 0.7$ c) $1.28 \div 0.8$ d) $2.16 \div 0.9$

6. Divide. Write each quotient to the nearest tenth.
   Use front-end estimation to check your answer is reasonable.
   a) $8.36 \div 2.4$ b) $1.98 \div 1.3$ c) $27.82 \div 3.9$ d) $130.4 \div 5.4$

7. A toonie is approximately 0.2 cm thick.
   How many toonies are in a stack of toonies 17.4 cm high?

8. The area of a large rectangular flowerbed is 22.32 m².
The width is 0.8 m. What is the length?

9. A 0.4-kg bag of oranges costs $1.34.
   a) Estimate. About how much does 1 kg of oranges cost?
   b) What is the actual cost of 1 kg of oranges?
      How do you know your answer is reasonable?
   c) Suppose you spent $10 on oranges.
      What mass of oranges did you buy?

10. **Assessment Focus** Alex finds a remnant
of landscaping fabric at a garden store.
The fabric is the standard width, with length 9.88 m.
Alex needs fourteen 0.8-m pieces for a garden patio.
   a) How many 0.8-m pieces can Alex cut from the remnant?
      What assumptions did you make?
   b) Will Alex have all the fabric he needs? Why or why not?
   c) If your answer to part b is no, how much more fabric does Alex need?
   d) Alex redesigns his patio so that he needs fourteen 0.7-m pieces of fabric.
      Will the remnant be enough fabric? Explain.

11. The quotient of two decimals is 0.12. What might the decimals be?
Write as many different possible decimal pairs as you can.

12. Last week, Alicia worked 37.5 h. She earned $346.88.
How much money did Alicia earn per hour?
Why is the answer different from the number in the calculator display?

13. The question 237 ÷ 7 does not have an exact quotient.
The first five digits of the quotient are 33857.
The decimal point has been omitted. Use only this information and estimation.
Write an approximate quotient for each question.
Justify each answer.
   a) 237 ÷ 0.7   **b)** 2.37 ÷ 0.07   **c)** 23.7 ÷ 7   **d)** 2370 ÷ 70

Reflect

Talk to a partner. Tell how you can find 1.372 ÷ 0.7 by dividing by 7.
Why does this work?