

At-Home Investigation

Sometimes arrays are quite large and need to be broken into smaller amounts to make the multiplication easier.

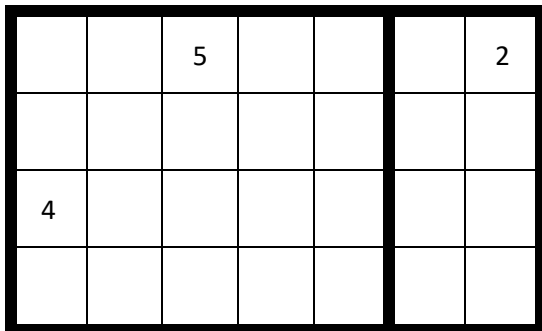
Examine a large Lego piece

The Lego piece below has lots of dots on it. It is 6 dots wide and 12 dots long. Draw a rectangle on your grid paper to represent the Lego piece. How long is it? How wide is it?



Think it through

Multiplying 6×12 is tricky. Perhaps there is a way that we can break up the 12 or the 6 to make it easier? Write down at least 2 ideas about how you could break your rectangle up to make it easier to work out the total number of squares. Here is an example of how we could break up 4×7 into a 4×5 part and a 4×2 part.

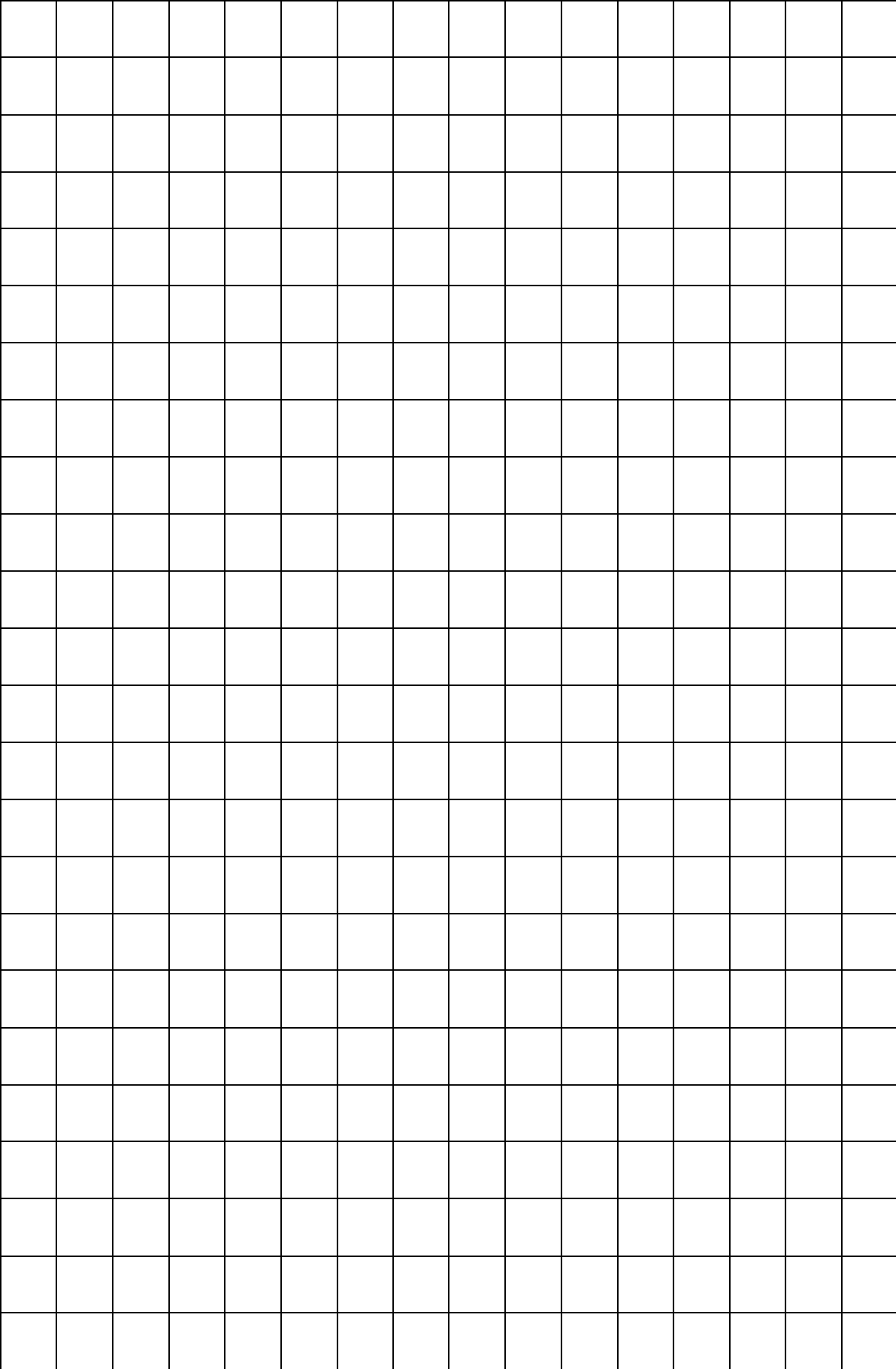


Try out at least 2 of your ideas on your grid paper. Sketch what you did here and write on the numbers. What did you find that worked?

Generalise your findings:

Do you think you could come up with a similar idea for other tricky numbers too? What might you do if one side of the rectangle was 8 and the other side was:

- 7
- 20
- 15
- 25



D20. Work out \times facts

You need to be able to work out how to multiply numbers and remember the answers quickly. In this activity you will work out each of the multiplication questions and fill the results into the table.

Strategies to use:

1. Skip counting (3, 6, 9)
2. Doubles (2, 4, 6, 8)
3. Counting on from what you know (I know 3×2 is 6, so 3×3 must be 3 more than 6)
4. Turn arounds (I know 4×5 is 20, so 5×4 is 20 too)

Choose a blank square. Line up the row it is in with the column it is in. There will be a number at the start of the row and at the start of the column. Multiply the two numbers and put the answer in that square. (Eg. see below: $4 \times 5 = 20$)

x	1	2	3	4	5	6	7	8	9	10
1			3							
2			6							
3			9							
4					20					
5				20						
6										
7										
8										
9										
10										

BACKWARDS QUESTION:

If my answer was 12, what numbers could I have multiplied to get it? Give as many answers as you can.

Multiplication practice grids:

	2	3	4	5	6	7	8	9	10
2									
3									
4									
5									
6									
7									
8									
9									
10									

	2	3	4	5	6	7	8	9	10
2									
3									
4									
5									
6									
7									
8									
9									
10									

	2	3	4	5	6	7	8	9	10
2									
3									
4									
5									
6									
7									
8									
9									
10									

	2	3	4	5	6	7	8	9	10
2									
3									
4									
5									
6									
7									
8									
9									
10									

Multiplying by 10 and 100

You have previously found some patterns for multiplying by ten. In this activity you will extend these patterns to multiply very large numbers.

Work out the following questions, then use a calculator to check afterwards:

Basic fact:	Extension of fact:	Further extension:	Check with the calculator:
Example 1: $6 \times 7 = 42$	$6 \text{ tens} \times 7 = 42 \text{ tens}$	$60 \times 7 = 420$	
Example 2: $4 \times 8 = 32$	$4 \times 8 \text{ hundreds} = 32 \text{ hundreds}$	$4 \times 800 = 3200$	
$3 \times 7 =$	$3 \text{ tens} \times 7 =$		
$9 \times 3 =$	$9 \times 3 \text{ tens} =$		
$2 \times 6 =$	$2 \times 6 \text{ hundreds} =$		
$5 \times 8 =$	$5 \text{ tens} \times 8 \text{ tens} =$		

What is the pattern? How many places have the original numbers moved away from the ones?

Use it to complete the table below:

Basic fact:	Extension of fact:	Further Extension:	What is the pattern?
$3 \times 8 =$	$3 \text{ tens} \times 8 =$		
	$9 \text{ hundreds} \times 7 =$		
		$2 \times 40 =$	
	$3 \times 5 \text{ hundreds} =$		
		$60 \times 40 =$	
	$9 \text{ tens} \times 6 \text{ hundreds} =$		

Extension:

What would you multiply 90 by to get 630?

Interleaved practice

Number:

- Complete the following number sequence:

1 486, 1 488, _____, 1 492, _____, _____, 1 498, _____, _____, _____

- $2\,342 - \underline{\hspace{2cm}} = 1\,127$

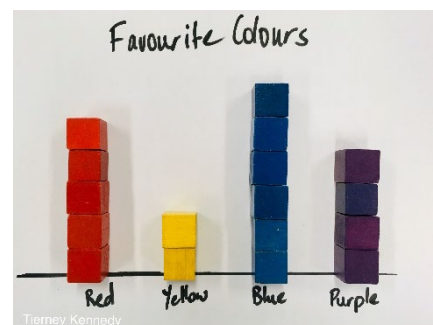
- What number is 1 more than 25 099? Now write the number that is 10 more and the number that is 100 more and the number that is 1000 more than 5 099.
- Read this number and say it: 51 708. Write it in words. How many tens of thousands, thousands, hundreds, tens and ones does it have?
- Share 30 counters to show halves. What other fractions can you make? How will you know if you have found them all?

Measurement/Geometry:

- Use a measuring jug from your kitchen. Find one container that holds less than your measuring jug and one that holds more than it. Use the measuring jug to find out how much water, each container will hold. Record your findings.
- If it is $2\frac{1}{4}$ hours until lunchtime, how many minutes do you have to wait? Show how you worked it out.
- On the back of this sheet, draw a simple map to show how to get from your bedroom to the kitchen. Include how many steps are needed and the turns you need to make.

Chance/Data:

- In this graph, each block represents 5 people.
How many people like each colour?
What else can you tell from the information in the graph?
Write 2 **true** statements.



Multiplying by tens and ones

Multiplying by tens and ones is easy once we can think in arrays. In this lesson we will learn how to break two-digit numbers into tens and ones to make them easier to multiply.

Use grid paper to draw 7 x 35

1. The 35 part can be separated into tens and ones. Draw a line to separate the 35 into 30 and 5.
2. Find the part that is 7 x 30. How many squares are there?
3. How is this similar to 7 x 3?
4. Find the part that is 7 x 5. How many squares are there?
5. So how many squares are there altogether?

Use grid paper to draw 9 x 24

1. The 24 part can be separated into tens and ones. Draw a line to separate the tens and ones.
2. Find the part that is 9 x 20. How many squares are there here?
3. How is this similar to 9 x 2?
4. Find the part that is 9 x 4. How many squares are there here?
5. So how many squares are there altogether?

The equation below represents the first question that you worked out (7 x 35). Look at it and try to find the 7 x 5 part and the 7 x 30 part.

$$\begin{array}{r}
 35 \\
 \times 7 \\
 \hline
 35 \\
 210 \\
 \hline
 245
 \end{array}$$

Which part is this number?

Which part is this number?

How did we get this number from 35 and 210?

Try these:

$ \begin{array}{r} 56 \\ \times 5 \\ \hline \end{array} $	$ \begin{array}{r} 27 \\ \times 6 \\ \hline \end{array} $	$ \begin{array}{r} 83 \\ \times 4 \\ \hline \end{array} $	$ \begin{array}{r} 49 \\ \times 2 \\ \hline \end{array} $	$ \begin{array}{r} 68 \\ \times 7 \\ \hline \end{array} $	$ \begin{array}{r} 92 \\ \times 5 \\ \hline \end{array} $