At-Home Investigation

How many different arrays can we make with 60 squares or blocks?

Draw the arrays and label them

Use the grid paper to draw as many unique arrays using 60 squares as you can. In this activity, 6x10 is considered to be the same as 10x6, so you only need to draw it once. You will probably need multiple sheets of grid paper and will also need to cut it and stick it together to make the right sizes.

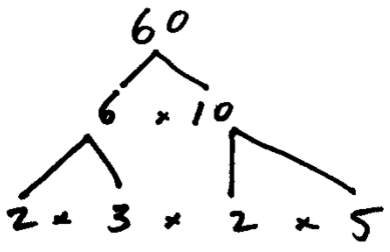
For each array, label the factors (the sides). Write each set of factors here:

Think it through

Can you find 2 other numbers between 50 and 100 that have as many or more factors than 60? Write the numbers and sketch the arrays and list the factors here:

Apply your thinking:

The factors of 60 can be broken down further into prime factors using a factor tree. The more prime factors a number has, the more factors it will have in general. Look at the factor tree below for 60. Use the same thinking to make a prime factor tree for the numbers you looked at for the previous question.



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:**
Example1: **6** x **7** = **42**	**6** tens x **7** = **42** tens	**6**0 x **7** = **4**20	
Example 2: **4** x **8** = **32**	**4** x **8** hundreds = **32** hundreds	**4** x **8**00 = **32**00	
3 x 7 =	3 tens x 7 =		
9 x 3 =	9 x 3 tens =		
2 x 6 =	2 x 6 hundreds =		
5 x 8 =	5 tens x 8 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 x 8 =	3 tens x 8 =		
	9 hundreds x 7 =		
		2 x 40 =	
	3 x 5 hundreds =		
		60 x 40 =	
	9 tens x 6 hundreds =		

Extension:
What would you multiply 90 by to get 630?

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 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.

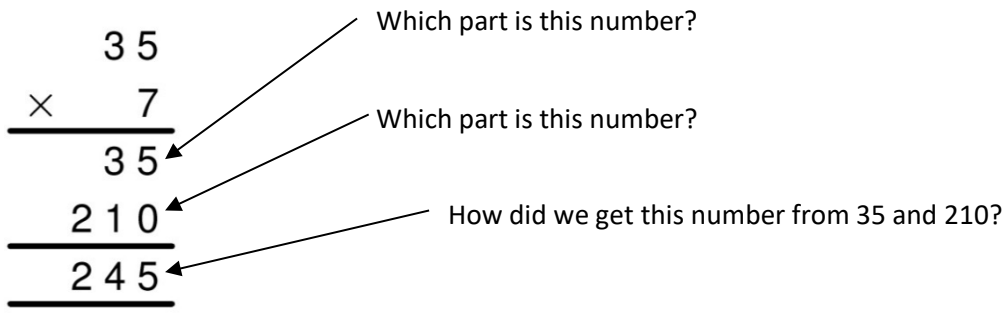
Use grid paper to draw 7 x 35

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.



Try these:

56	27	83	49	68	92
x 5	x 6	x 4	x 2	x 7	x 5

Interleaved practice

Number:

1. Complete the following number sequence:

   8.73, 8.83, _____, _____, _____, 9.23, _____,

2. 2 342 - _____ = 1 127

3. What number is 1 more than 495 099?
   Now write the number that is 10 more and the number that is 100 more and the number that is 1000 more and the number that is 10 000 more than 495 099.

4. Read this number and say it: 4 051 738. Round it to the nearest 10, the nearest 100, the nearest 1000, and the nearest 10 000.

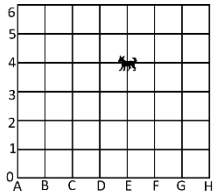
5. Share 30 counters to show halves. Draw the halves on the other side of this sheet.
   What other fractions can you make? How will you know if you have found them all?

Measurement/Geometry:

6. 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.

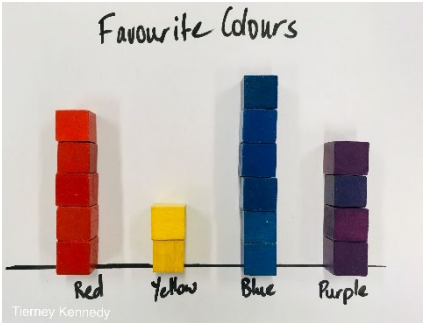
7. If you begin your lunch break at 13:20 and take 45 minutes to make and eat it, what time will you finish it? Write your answer in 24-hour time and analogue time? (reading a clockface)

8. Write the grid reference for the dog.
   Draw another dog at C,2 on the grid.



Chance/Data:

9. 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.



	3	4	6	7	8
3					
4					
6					
7					
8					

	3	4	6	7	8
3					
4					
6					
7					
8					

	3	4	6	7	8
3					
4					
6					
7					
8					

	3	4	6	7	8
3					
4					
6					
7					
8					

D18. Distributive Law

TR p86

Often using mental strategies when multiplying is quicker than using a calculator. Look at the following examples, and work out how the 'distributive law' is being applied.

Distributive Law: Used when breaking up an equation into smaller parts makes it easier.

Examples:

- 19 x 5 = (9 x 5) + (10 x 5) = 45 + 50 = 95
- 36 x 9 = (30 x 9) + (6 x 9) = 270 + 54 = 324

Try these:

33 x 4 = ( ) + ( ) = _____ + _____ = _____

23 x 5 = ( ) + ( ) = _____ + _____ = _____

35 x 7 = ( ) + ( ) = _____ + _____ = _____

54 x 6 = ( ) + ( ) = _____ + _____ = _____

37 x 2 = ( ) + ( ) = _____ + _____ = _____

What do you think the distributive law does?

How do you know?

Where could you use this?

Backwards Questions:

Try to use the distributive law together with what you have learned about extending multiplication facts to solve the following:

330 x 4 = ( ) + ( ) = _____ + _____ = _____

23 x 50 = ( ) + ( ) = _____ + _____ = _____

350 x 70 = ( ) + ( ) = _____ + _____ = _____

Look up the Distributive Law using a mathematical dictionary and write a definition for it using your own words:

