Monday: Find multiples and factors
Tuesday: Investigate square numbers
Wednesday: Find prime numbers less than 50
Thursday: Use partitioning to multiply 3-digit numbers by 1-digit numbers.
Friday: Multiply 3 digits by 1 digit (ladder method)

Common Misconceptions

Not recognising multiples and guessing rather than being secure with times tables. Some children do not recognise multiples or find factors easily.

Misremembering and mixing up the times tables. Some children are not able to recognise multiples nor use mental division strategies.

Monday

LO To find multiples and factors

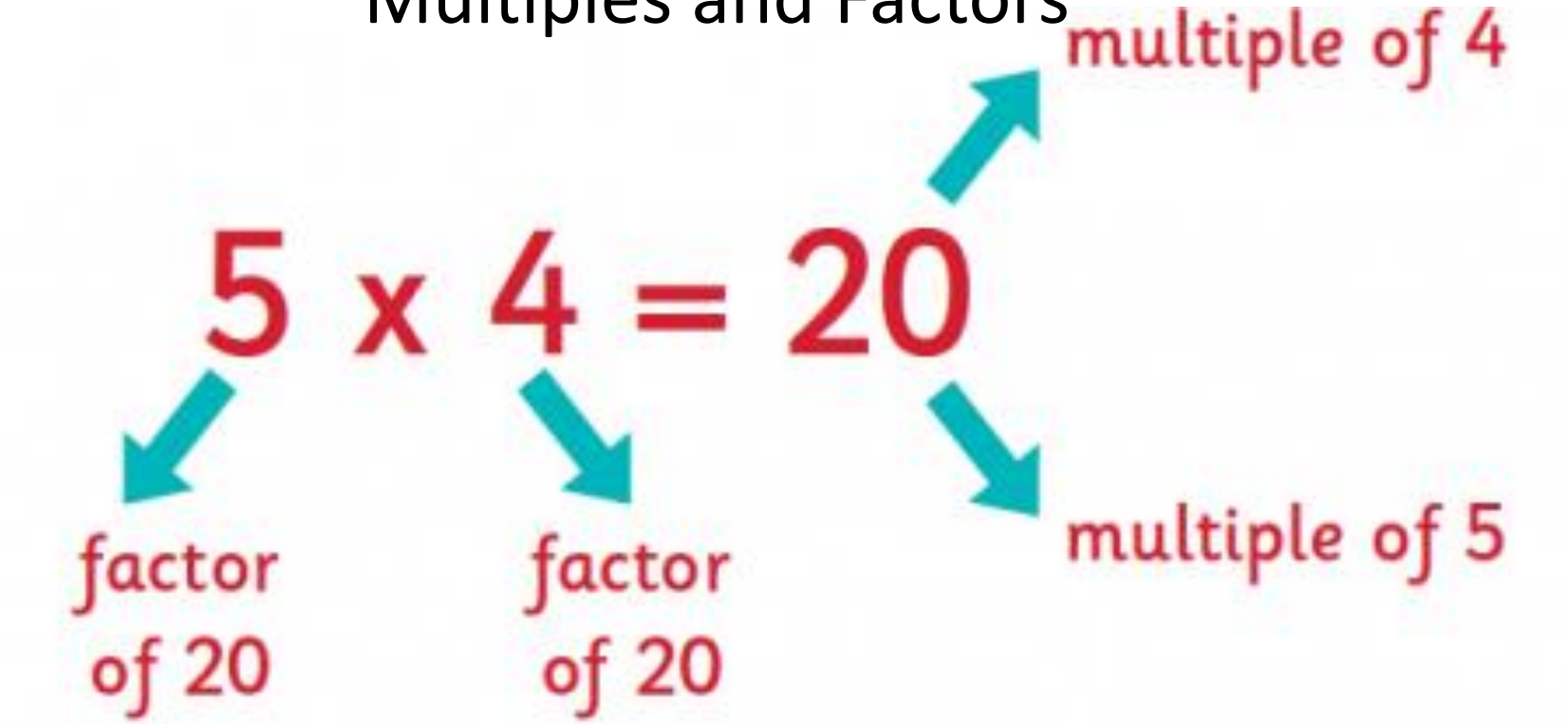
Settling Task

LO To find multiples and factors

True or False?

13.6 rounded to the nearest whole number is **14**	True ☐ False ☐
65. 21 rounded to the nearest tenth is **65.20**	True ☐ False ☐
3.04 rounded to the nearest tenth is **3.0**	True ☐ False ☐
0.56 rounded to the nearest tenth is **0.50**	True ☐ False ☐
0.99 rounded to the nearest whole number is **0.1**	True ☐ False ☐

Multiples and Factors



This number sentence tells us that 20 is a multiple of 5 and is also a multiple of 4.

It also tells us that 5 and 4 are factors of 20.

List ALL the pairs of factors of 36.

Pairs of factors of 36:
1 and 36, 2 and 18, 3 and 12, 4 and 9, 6 and 6.

Pair of factors: 4 and 9

4 x 9 = 36
4 x 90 = 360
4 x 900 = 3600
4 x 9000 = 36,000
36 ÷ 9 = 4
360 ÷ 9 = 40
360 ÷ 90 = 4
3600 ÷ 9 = 400

If we know 4 × 9 = 36, what is 4 × 90? 4 × 900? 4 × 9000?

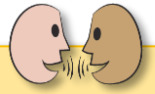
What is 36 ÷ 9? So what is 360 ÷ 9? 360 ÷ 90? 3600 ÷ 9?

Use one other pair of factors to generate a similar list of facts using place value.

Now list ALL the pairs of factors of 24.

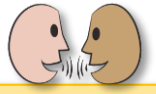
Pairs of factors of 24:
1 and 24
2 and 12
3 and 8
4 and 6.

1, 2, 3, 4, 6 and 12 are all common factors of 24 and 36.



With a partner, list all the common factors of 18 and 24. What is the highest?

What is the highest common factor of 24 and 36?



With a partner, write at least three numbers which have both 3 and 4 as factors. These numbers are **common multiples of 3 and 4.**

Which is the **lowest common multiple** of 3 and 4, the smallest number that both 3 and 4 go into?

Now find the lowest common multiple of 6 and 9. Is there a multiple that is smaller than the product of 6 and 9?

In your books:
Draw this table and wite the following numbers in the correct column:

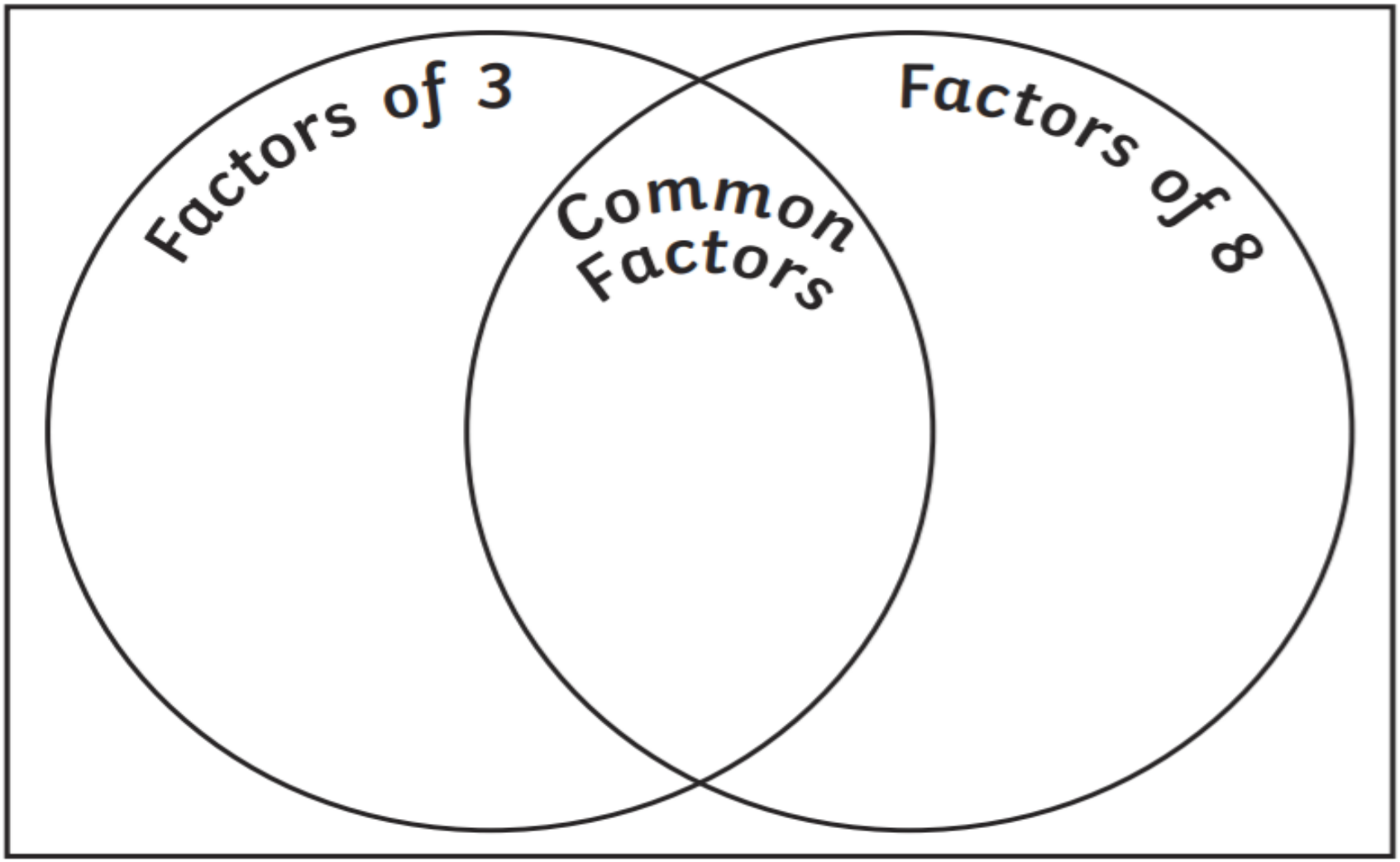
2 3 4 5 6 8 9 12

Factor of 15	Factor of 16	Multiple of 3

USE A RULER!

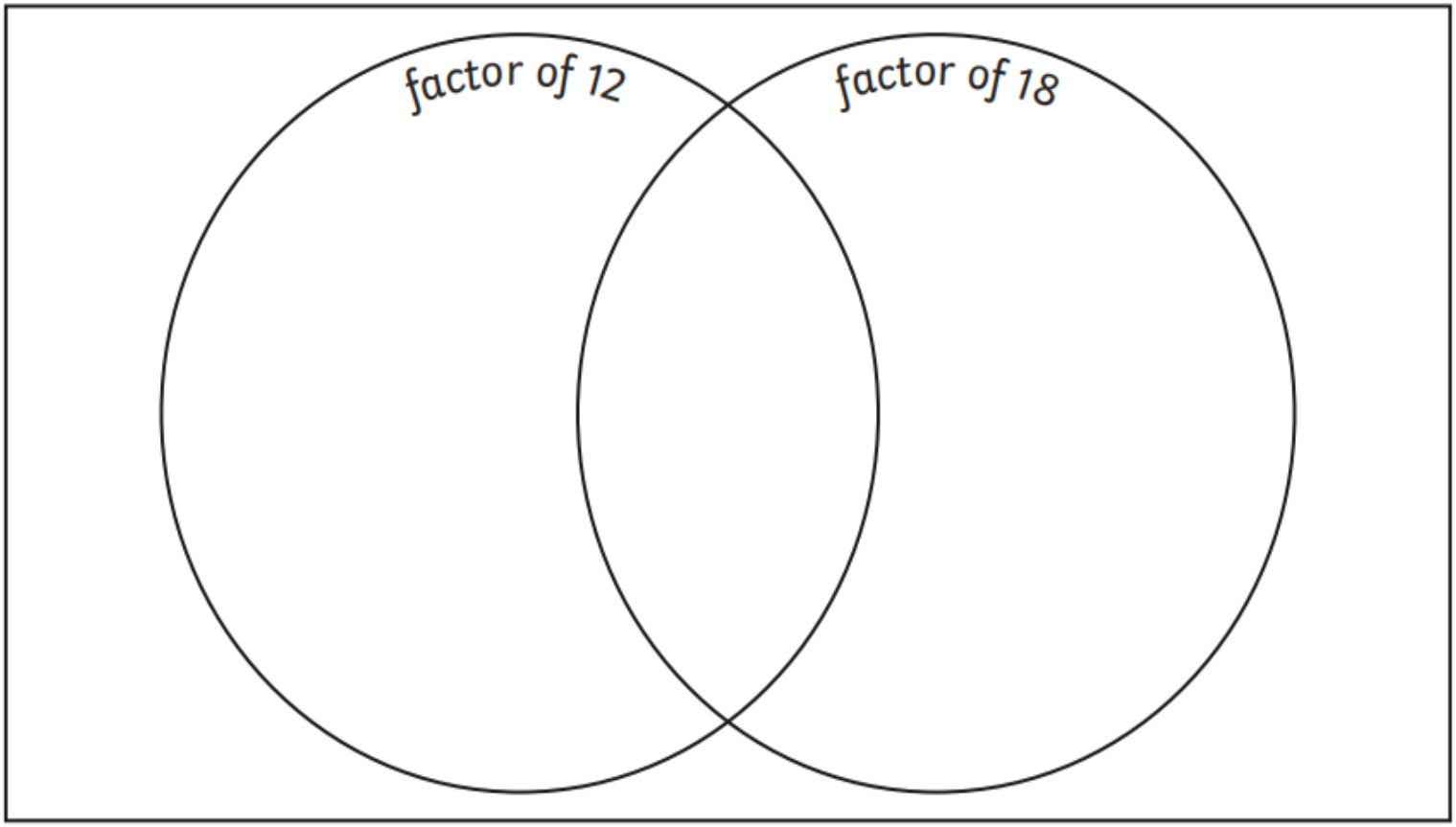
Challenge: what is the highest common factor of 15 and 16?

Find the common factors of 3 and 8
What is the highest common factor?



Activity

Place the numbers 1-18 correctly onto the Venn diagram.



What are the common factors? _____

What is the highest common factor? _____

When you finish - complete these questions

Write two different multiples of 3 and 5.

Write two common factors of 18 and 24.

2 3 4 5 8

Choose a pair of numbers and write a common multiple.

Repeat three times.

12 15 24 27 30

Choose two numbers and write a common factor.

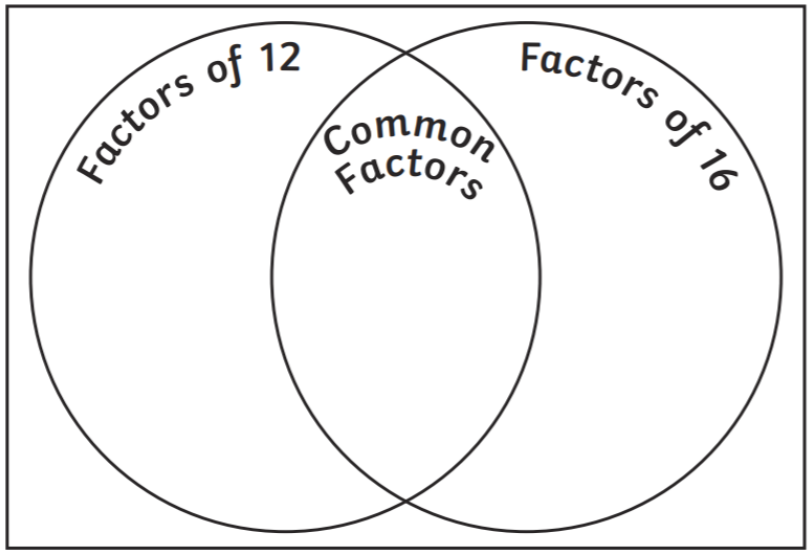
Repeat three times.

Write a common multiple of 2, 3 and 4.

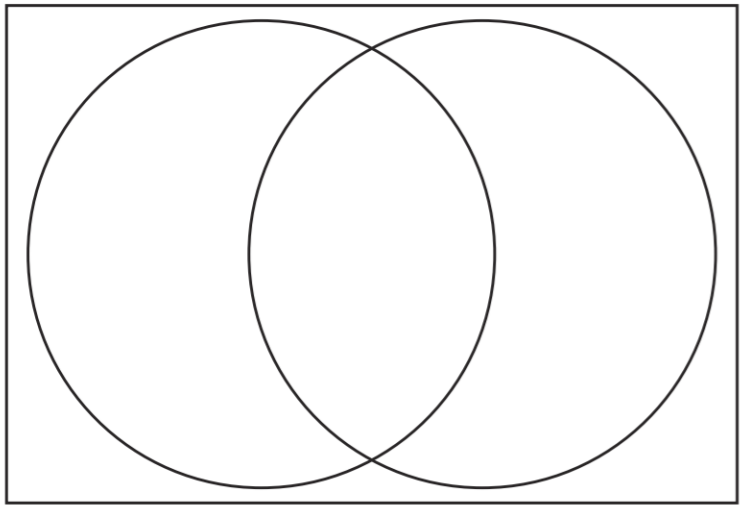
Write a common factor of 15, 20 and 30.

Sometimes / Always / Never? Numbers have an even number of factors.

SEND



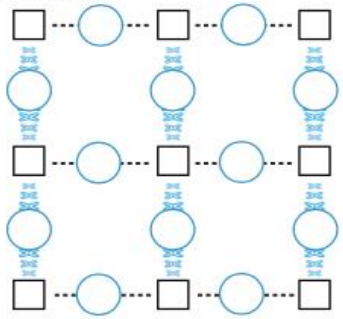
8 and 20

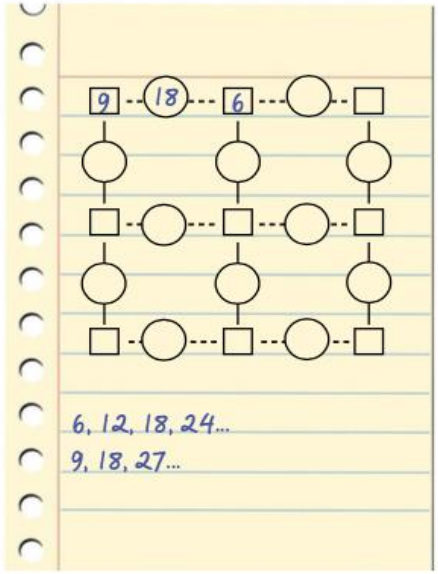


CHALLENGE

LCM squares

1. Use this grid.





2. Write the numbers 2, 3, 4, 5, 6, 8, 9, 10 and 12 in the squares, one number in each square.

3. In the circles between each pair of squares, write the LCM (lowest common multiple) of the two numbers.

4. Add all your circled numbers, first adding pairs and crossing them out, and then adding pairs of those totals and finally adding the last three numbers.

5. Start with a new grid.

6. Re-arrange your numbers and repeat.

FIND THE SMALLEST TOTAL POSSIBLE!

Challenge

? Are some numbers used more than others are?

Demonstrate that you have found the smallest possible total.

Thinking Task

Use a 100 square to help you

- *'I'm thinking of a whole number less than "100".'*
- *'It is a multiple of "6".'*
- *'"5" is a factor of this number.'*
- *'It is also a multiple of "12".'*
- *'What number am I thinking of?'*

Tuesday

LO To investigate square numbers

Settling Task

LO To investigate square numbers

Round to the nearest whole number.

$8\frac{3}{8}$ 8·38 8·83

Retrieval

13

15

21

23

18

24

30

Choose one of these numbers.

Roll a 1 to 6 dice.
Start with 10 points.
If the number rolled is a factor of your number, you lose a point!

You can now change your number if you want to…

Which were 'good' numbers to choose for this game and which were not? Why?

Some numbers such as 18 and 24 have lots of factors; in fact 24 has all the numbers on the dice as factors except for 5! But 13 and 23 only have themselves and 1 as factors so you only lost points if 1 came up on the dice.

Be the Teacher

Why a square is a square

Draw it	Definition
Draw it again (in a different orientation or size)	Non-example

I Do

Silent modelling

$2 \times 2 = 4$

$2^2 = 4$

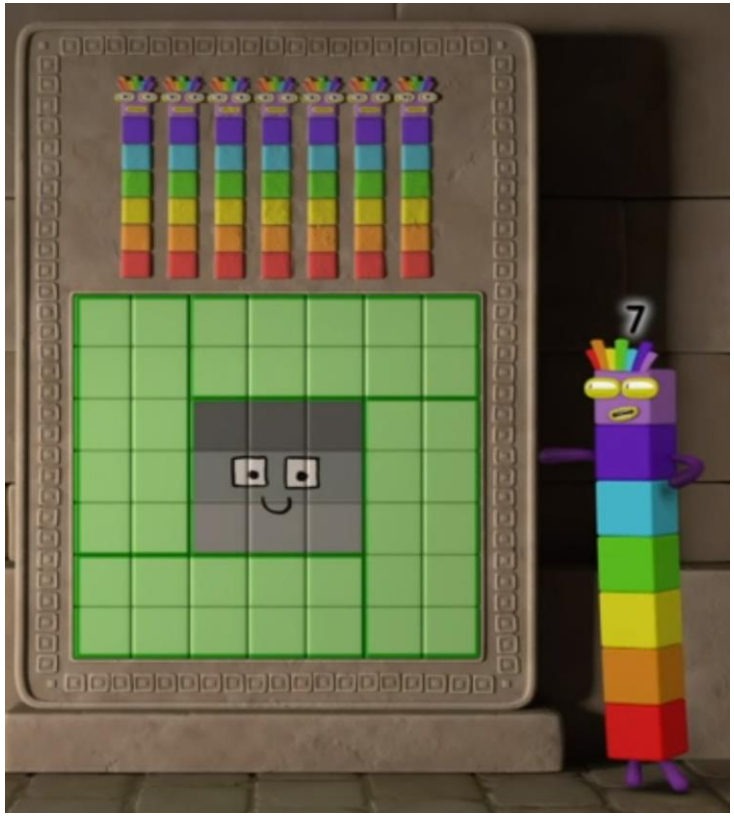
We Do

3 x 3 =

What is the correct number sentence we use to write this?

You Do

Investigation

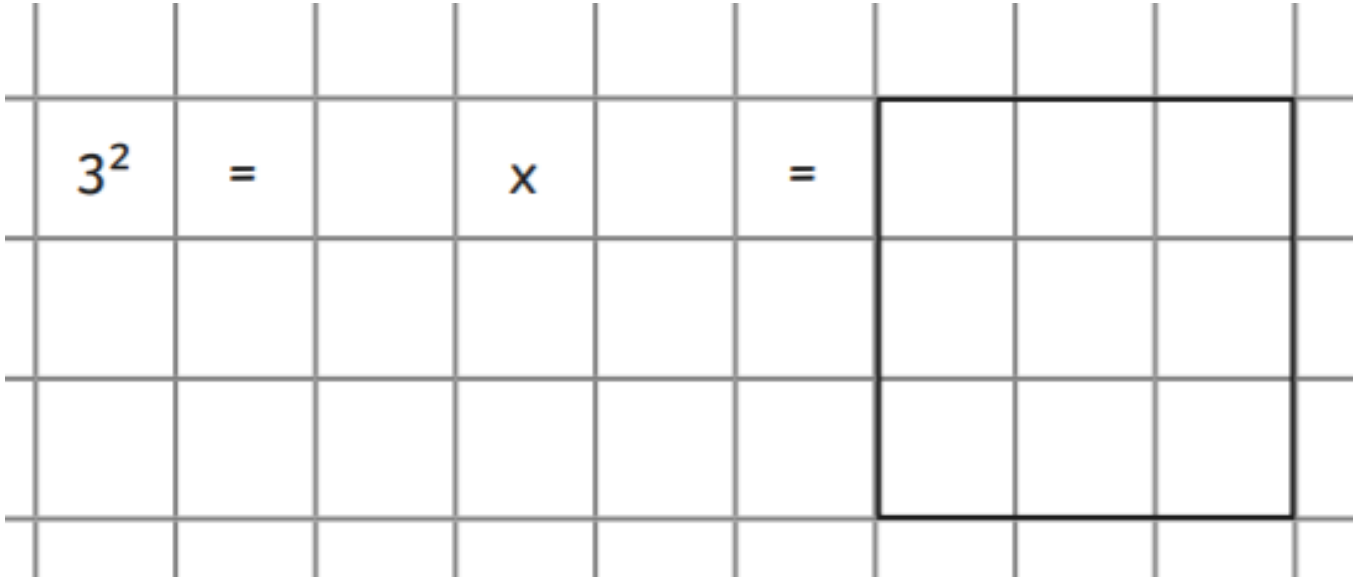


- Create a square array using 16 cubes.
- What factor does the square array show?
- Does 16 have an odd or even number of factors? Why?
- Will other square numbers have an odd or even number of factors? Why?
- Explore the factors of the other square numbers, using cubes if

In your books

Draw the representations of 2^2, 3^2, 4^2 and 5^2

Example:



If you finish - try and complete these calculations:

$8^2 + 10^2 =$

$2^2 + ?^2 = 13$

$10^2 - 5^2 =$

$?^2 + 5 = 30$

Extension: Create your own calculation for your partner to solve

SEND

Arrays in books

CHALLENGE

Cycling Squares

Age 7 to 11
Challenge Level ★★

In the circle of numbers below each adjoining pair adds to make a square number:

For example,

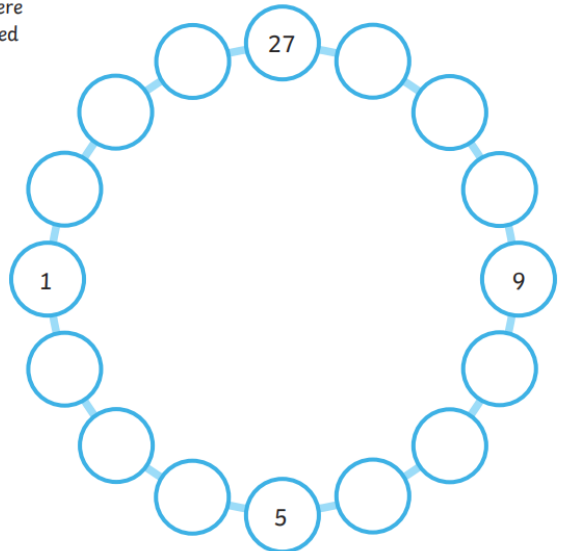
$14 + 2 = 16, 2 + 7 = 9, 7 + 9 = 16$

and so on.

Can you arrange the numbers in the circles so that each adjoining pair adds to make a prime number?

2, 3, 4, 6, 7, 8, 10, 11, 12, 14, 15, 16

Top Tip: think about where the odd numbers will need to be placed.



Thinking Task

Odd Squares

Age 7 to 11
Challenge Level ★

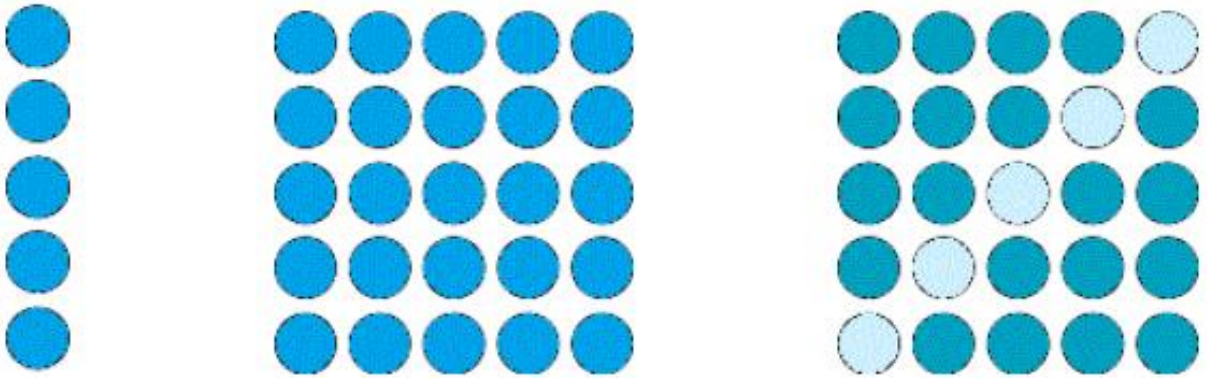
Think of a number.
Square it.
Subtract your starting number.

Is the number you're left with odd or even?

Try with other numbers.

What do you notice?

How do these images help you explain your observations?



Wednesday

LO To find prime numbers less than 50

Settling Task

LO To find prime numbers less than 50

Who Am I?

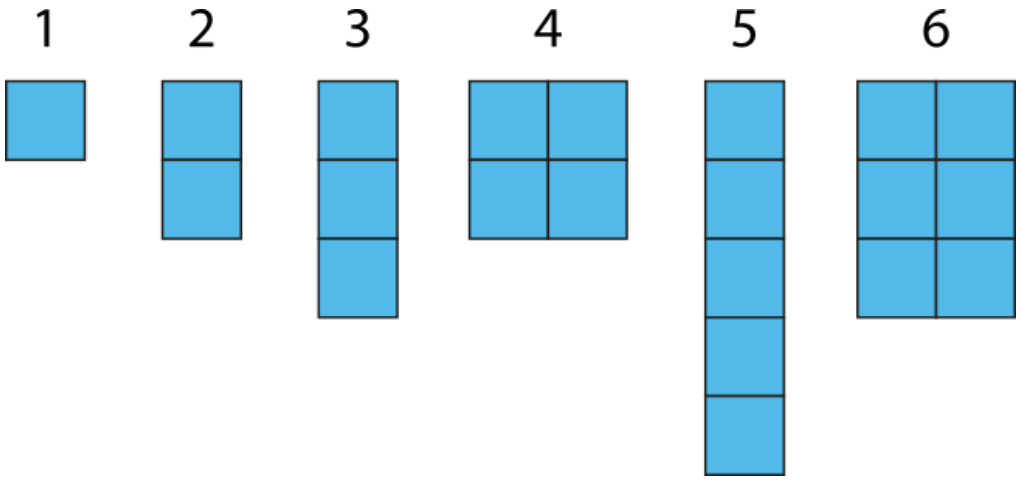
- I am larger than 6.
- To the nearest whole, I round down not up.
- My ones digit is odd, but my tenths digit is even.

Who am I?

5.28	9.84	8.37	7.85
7.24	8.6	9.7	6.8

Extension: write your own riddle for one of the numbers above

Silent modelling - model the diagrams below



Discuss

- What do you notice about the arrays that have been created for the first six counting numbers?
- Could any of the arrays have been created in different ways? What do those arrays tell you about the number of factors that number has?
- What do we call number which only have 2 factors ?

Numbers with only two factors, the number itself and 1, are called prime numbers.
2 is the smallest prime number, as 1 just has one factor not two.
Numbers that have more than themselves and 1 as factors are called composite numbers.

Work out which numbers from 2 to 10 are primes.

These are the prime numbers from 2 to 10.
All the other numbers are composite numbers.

2
3
5
7

https://www.bbc.co.uk/bitesize/topics/zfq7hyc/articles/z2q26fr

What are prime numbers?

Part of Maths

+ Add to My Bitesize

Whole class activity

- Work in pairs to try to find all the prime numbers to at least 50. Use the manipulatives to help you work it out.
- Can you find a pattern?

Challenge: Only one of these numbers is prime:

123, 131, 145, 153, 164

Can you work out which it is?

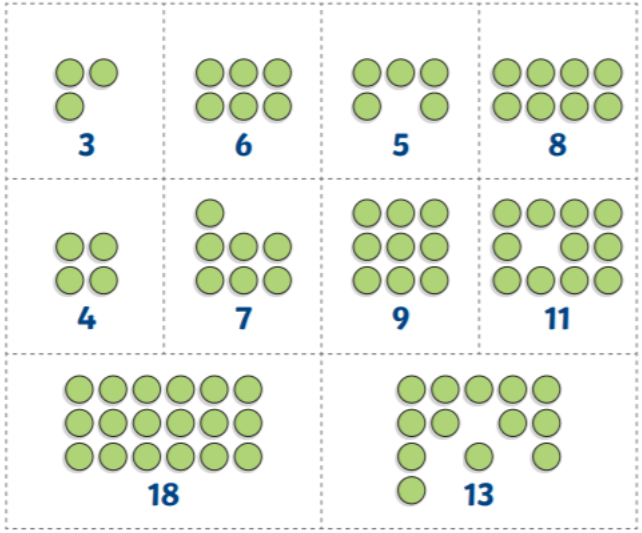
Explain your mathematical thinking…

Wednesday
2.3.22
LO: To investigate prime numbers.

a 3, 9, 18
b 4, 5, 10
c 7, 9, 12
d 12, 15, 17
e 21, 23, 25
f 31, 33, 35
g 27, 37, 57
h 53, 54, 55

Which number is the prime number in each group?

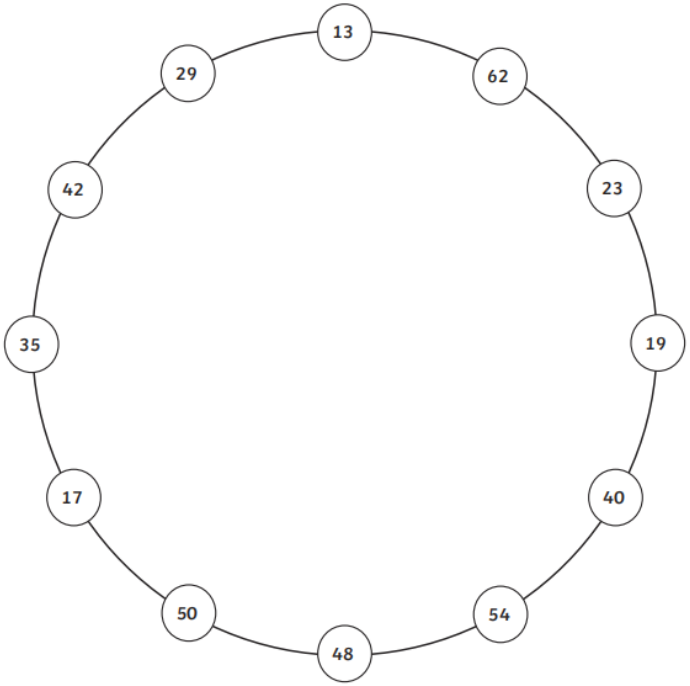
SEND



Prime Numbers (Incomplete Arrays)	Composite Numbers (Complete Arrays)

CHALLENGE

Can you draw lines to add one number to another to make all the primes from 50 to 100?
Record your calculations as you go along.



Helena chooses a prime number. She multiplies it by 10 and then rounds it to the nearest hundred. Her answer is 400. List three numbers that Helena's number could be.

Thinking Task

Quizzes:

Factors: https://www.bbc.co.uk/bitesize/topics/zfq7hyc/articles/zp6wfcw

Prime Numbers: https://www.bbc.co.uk/bitesize/topics/zfq7hyc/articles/z2q26fr

Problem solving and reasoning questions

Year 5

Is the lowest common multiple of 6 and 4 smaller than the highest common factor of 30 and 45?

Write common factors of 24 and 48.
Write common multiples of 3 and 5 up to 60.
Are any numbers in both sets?

True or false?
There are exactly four 2-digit, common multiples of 3 and 7.
4 and 5 are common factors of all 2-digit multiples of 10.
15 is a factor of 100.

Problem solving and reasoning answers

Year 5

Is the lowest common multiple of 6 and 4 smaller than the highest common factor of 30 and 45? Yes.
The lowest common multiple of 6 and 4 is 12.
The highest common factor of 30 and 45 is 15.

Write common factors of 24 and 48. 1, 2, 3, 4, 6, 8, 12 and 24, i.e. all the factors of 24 are also factors of 48 (but not vice versa).
Write common multiples of 3 and 5 up to 60. 15, 30, 45 and 60.
Are any numbers in both sets? No.

True or false?
There are exactly four 2-digit, common multiples of 3 and 7.
True – 21, 42, 63 and 84.
4 and 5 are common factors of all 2-digit multiples of 10.
False - they are common factors of 20, 40, 60 and 80 but not of 30, 50, 70 or 90.
15 is a factor of 100. False.

Thursday

LO To use partitioning to multiply 3-digit numbers by 1-digit numbers.

Settling Task

LO To use partitioning to multiply 3-digit numbers by 1-digit numbers.

Who Am I?

- I am larger than 6.
- To the nearest whole, I round down not up.
- My ones digit is odd, but my tenths digit is even.

Who am I?

5.28	9.84	8.37	7.85
7.24	8.6	9.7	6.8

Extension: Round the numbers in the top row to the nearest whole number and the nearest 10th.

I Do

Silent Modelling - Grid Method & Partitioning

76 x 3 =

×	70	6	
3	210	18	228

We Do

×	100	30	4	
3	300	90	12	402

What is 100 × 3?

30 × 3?

4 × 3?

Finally add
300 + 90 + 12.

Partition 134; write the numbers on the grid...

You Do

×	200	50	6	
3	600	150	18	768

Now draw a grid on your whiteboards and try 3 × 256.

What is 200 × 3?

Let's check through that.

50 × 3?

6 × 3?

Partition 256 and put the numbers on the grid.

Finally add
600 + 150 + 18.

×	300	40	5	
5	1500	200	25	1725

Now try 5 × 345. What happens this time?

What is 300 × 5?

Let's check through.

40 × 5?

Partition 345 and put the numbers on the grid.

5 × 5?

Finally add 1500 + 200 + 25.

300 × 5 gave us a 4-digit number. Be careful with the final adding up!

×	500	70	6	
3	1500	210	18	1728

Now try 576 × 3.

What is 500 × 3?

Let's check through.

70 × 3?

Partition 576 and put the numbers on the grid.

6 × 3?

Finally add
1500 + 210 + 18.

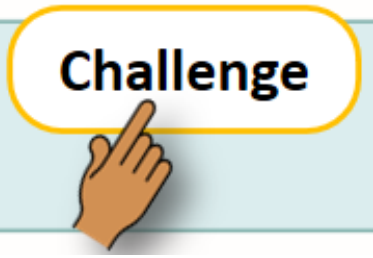
Practice

3 x 47	4 x 492
147 × 3	123 × 5
3 x 291	5 x 181
513 × 4	363 × 8
4 x 488	8 x 428
623 × 5	9 x 314

Challenge

Find the missing numbers in this calculation:

63☐ x 6 = ☐822



SEND

Moving multiplications

Work in pairs

Things you will need:
- A set of 0 to 12 cards
- Multiples strips
- A pencil

What to do:

- Choose a pair of times tables. Find that table.
- Shuffle a pack of 0 to 12 cards and place face down.
- Turn the cards over one at a time.
- Write the number in the left column of the table.
- Multiply that number by the two numbers in the table, e.g. 2 and 20.
- Write the answers on the table.
- Repeat with another pair of tables.

	x 2	x 20
3	6	60
0	0	0
8	16	160
4	8	

	x2	x20

CHALLENGE

Multi-Step Multiplication Word Problems

Challenge Cards

twinkl

Multi-Step Multiplication Word Problems

2. A child has 2 complete albums of football stickers. The first has 28 pages with 15 stickers on each page, and the second has 36 pages with 6 stickers on each page. How many football stickers are in both albums?

Thinking Task

Adam buys **6** bags of white balloons.

Chen buys **3** bags of red balloons.

Adam says,

'I have four times as many balloons as Chen.'

Explain why Adam is correct.

Friday

LO To multiply 3 digits by 1 digit (ladder method)

Settling Task

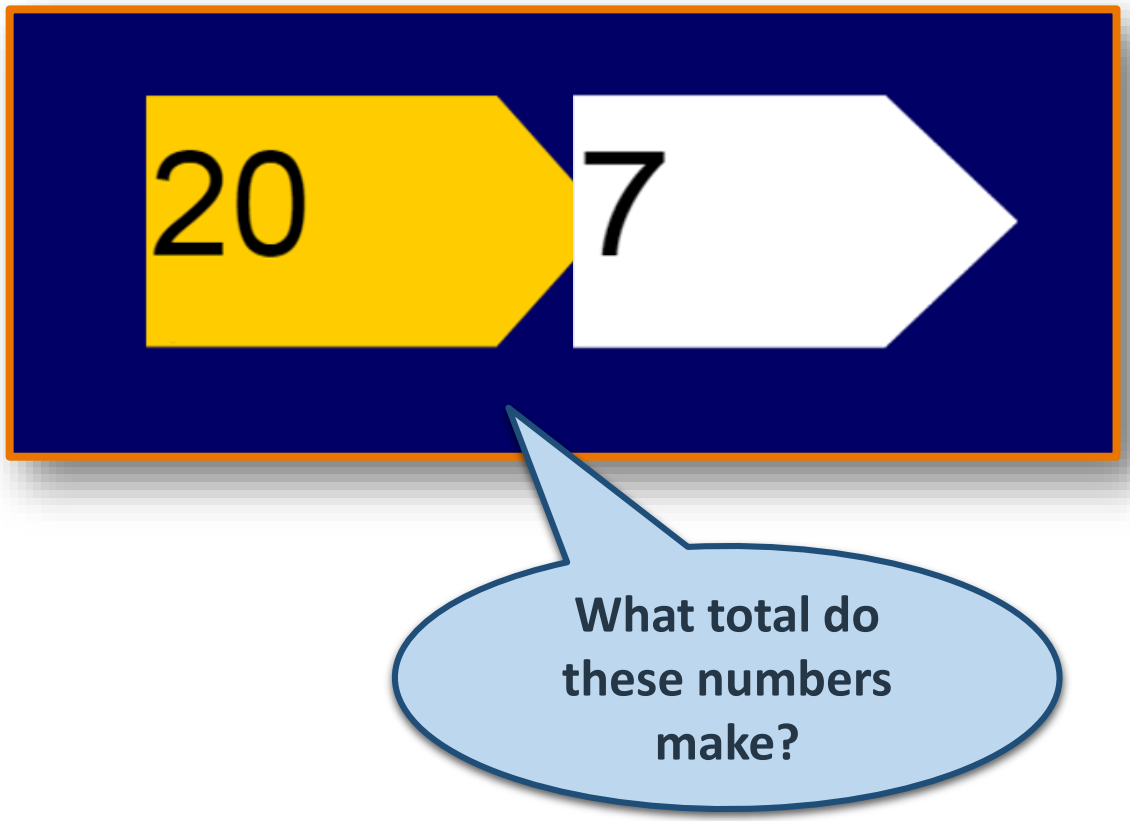
LO To multiply 3 digits by 1 digit

Guess the Decimal

Each clue has a different decimal as its answer

My decimal does not round to 2 and only has 1 even digit.
My number does not round to 3 and has less than 5 tenths.
My number rounds to 4 and my first digit subtract my second digit equals 1.

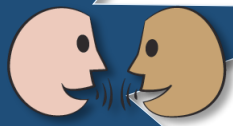
2.1	4.3	3.2
3.3	3.9	2.4
4.1	4.2	3.8



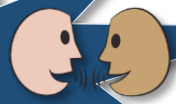
$$20 + 7 = \mathbf{27}$$

What is double 27?

With your partner… one of you double the 10s and one of you double the 1s.



Then add your numbers together.



Double 20 = 40

Double 7 = 14

40 + 14 = 54

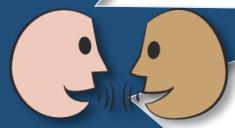
We solved it using **partitioning**.

Partitioning means we split the number into 10s and 1s.

We **doubled** each part then **recombined** the parts.

Now double 47 using partitioning.

With your partner… one of you double the 10s and one of you double the 1s.



Then add your numbers together.

Double 40 = 80

Double 7 = 14

80 + 14 = 94

What happens when we try to double *these* numbers using **partitioning?**

The answers are all > 100.

97

78

64

85

69

59

76

Doubling numbers

Sheet 1

Double the following numbers using partitioning:

1. 14

2. 22

3. 36

4. 27

5. 44

6. 39

Challenge

Now try these:

7. 55

8. 73

9. 48

10. 61

Challenge

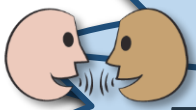
On your whiteboards find 423 × 6 using the grid method.

×	400	20	3	
6	2400	120	18	2538

$$\begin{array}{r} 423 \\ \times \quad 6 \\ \hline 2400 \\ 120 \\ 18 \\ \hline 2538 \end{array}$$

Let's check that through.

We can also set out 3-digit multiplication this way – it is called the ladder method.



Talk to your partner – can you see where each number in the ladder method comes from?

3 × 6?

The three multiplications are just the same AND the numbers are already neatly set out for addition!

On your whiteboards find **543 × 7** using **the grid method** and then the **ladder method**.

×	500	40	3	
7	3500	280	21	3801

$$\begin{array}{r} 543 \\ \times \quad 7 \\ \hline 3500 \\ 280 \\ 21 \\ 1 \\ \hline 3801 \end{array}$$

Let's check with the **grid method**.

What is **500 × 7**?

40 × 7?

3 × 7?

Let's check with the **ladder method**.

Finally ad
3500 + 280

Remember! All the **multiplications** are the same!

Finally use **column addition** to add:
3500 + 280 + 21

Now try 6 × 359 using both methods.

×	300	50	9	
6	1800	300	54	2154

$$\begin{array}{r} 359 \\ \times \quad 6 \\ \hline 1800 \\ 300 \\ 54 \\ 1 \\ \hline 2154 \end{array}$$

Who can t[illegible] through with the grid method?

The partitioning is more obvious when we use grid method.

Who can talk that through with the ladder method?

The addition at the end can be easier with ladder method as the partial products are already in columns.

Practice

Solve these using the ladder method.

324 x 3	365 x 6
437 x 5	463 x 4
4 x 582	8 x 508
6 x 206	3 x 213
132 x 8	5 x 145

Challenge

Will 354 x 6 have a larger or smaller answer than 654 x 3? How do you know?

Will 315 x 4 have a larger or smaller answer than 415 x 3? How do you know?