ArithmeKit 2

The essential maths toolkit

A collection of rich problem solving and reasoning activities designed to deepen children's understanding of the Number strands (place value and calculation) of the National Curriculum for Mathematics and improve their arithmetical proficiency.

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First published in 2016 by Buzzard Publishing

Contents

Teacher notes

ArithmeKit 2 offers a range of 120 problem solving and reasoning activities to strengthen and deepen understanding of key number and calculation skills and strategies.

The 24 skills and strategies, essential elements of any successful mathematician's toolkit, have been carefully selected to develop pupils' conceptual understanding. By exploring the structure of mathematics and noticing relationships, the activities aim to improve fluency in calculation, develop a secure and deep understanding, help pupils make connections and address the requirements of the end of Key Stage 1 and 2 Arithmetic national assessments.

Each section has 2 pages containing 5 activities:

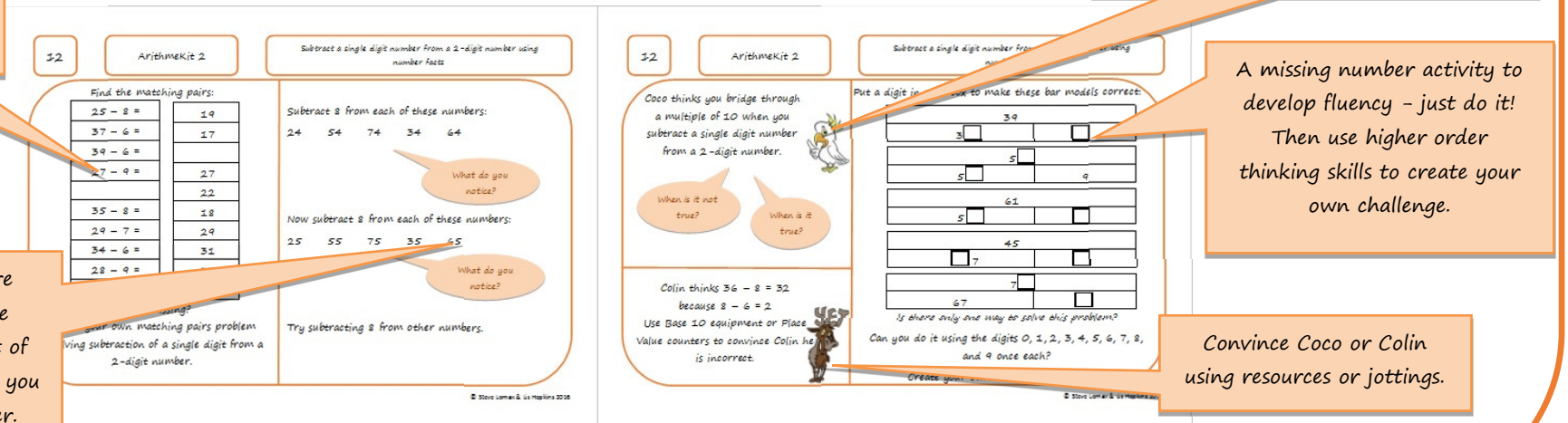
An activity to develop fluency – just do it! Then use higher order thinking skills to create your own challenge.

A 'true or false' statement to investigate further. Do you agree with Colin or Coco? Explore a conjecture by asking "When is it true?"

A missing number activity to develop fluency – just do it! Then use higher order thinking skills to create your own challenge.

An activity to explore relationships and the structure of an aspect of number. Ask "What do you notice?" to dig deeper.

Convince Coco or Colin using resources or jottings.



1

ArithmeKit 2

Explain about 10s and 1s in 2-digit numbers

Find the matching pairs:

34	Four tens and one one
14	Three tens
43	Three tens and four ones
12	One ten and two ones
41	Three tens and two ones
40	
32	Two tens and three ones
13	Four tens
	One ten and four ones
23	Four tens and three ones

What's missing?

Create your own matching pairs problem involving 10s and 1s in 2-digit numbers.

Fill in the missing numbers:

34 = ☐ tens and ☐ ones

43 = ☐ tens and ☐ ones

37 = ☐ tens and ☐ ones

25 = ☐ tens and ☐ ones

73 = ☐ tens and ☐ ones

52 = ☐ tens and ☐ ones

What do you notice?

Now try these:

50 + 2 = ___

50 + 7 = ___

60 + 2 = ___

60 + 7 = ___

50 + 3 = ___

50 + 5 = ___

60 + 4 = ___

60 + 3 = ___

50 + 8 = ___

50 + 4 = ___

60 + 5 = ___

60 + 8 = ___

What do you notice?

1

ArithmeKit 2

Explain about 10s and 1s in 2-digit numbers

Colin says, ''When you count in 1s only the 1s digit changes.''

When is this not true?

Do you agree with Colin?

Put digits in the empty boxes to make these true:

□ tens and four ones = 54

□ tens and six ones = □□

□ tens and □ ones = 14

□ tens and □ ones = □□

□ tens and □ ones = 80

Eight tens and 12 ones = □□

Is there only one way to solve this problem?

Can you do it using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 at least once each?

Create your own missing digit problem.

Using base 10 resources, convince yourself that 1 more than 29 is 30

Convince Coco that 1 less than 40 is 39

2

ArithmeKit 2

Compare and order numbers to 100 and position them on a number line

Find the matching pairs by working out which number could go in the gap:

62	23, ___, 25
12	29, ___, 40
24	
96	20, ___, 26
8	45, ___, 51
22	60, ___, 70
69	98, 99, ___,
30	1, ___, 15
100	90, ___, 98
50	11, ___, 14

What's missing?

Create your own matching pairs problem involving comparing and ordering numbers to 100

What numbers could go in the gaps?

23, ☐, 28

33, ☐, 48

13, ☐, 18

63, ☐, 68

What do you notice?

Try again with different numbers.

Put digits in the boxes to find at least 8 ways to make this statement true:

5 ☐ < ☐ 3

What do you notice?

2

ArithmeKit 2

Compare and order numbers to 100 and position them on a number line

Coco thinks that a number with 6 ones is bigger than a number with 5 ones.

When is this not true?

Do you agree with Coco?

Using resources, convince yourself that a number with 3 tens is smaller than a number with 4 tens.

Convince Colin that 51 is more than 39

Fill in the missing digits to make a list of numbers in order from smallest to largest:

□, □4, 1□, □□, □4, 4□,

46, □□, □3

Can you do it in different ways?

Can you do it using only two different digits?

Can you do it using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 once each?

How close could the numbers be on a number line?

How far apart could they be?

Partition a 2-digit number in different ways

Spot the odd one out in each set:

i)

34	10 + 24
20 + 14	30 + 14

ii)

50 + 15	50 + 5
30 + 25	55

iii)

40 + 6	30 + 16
10 + 26	20 + 10 + 16

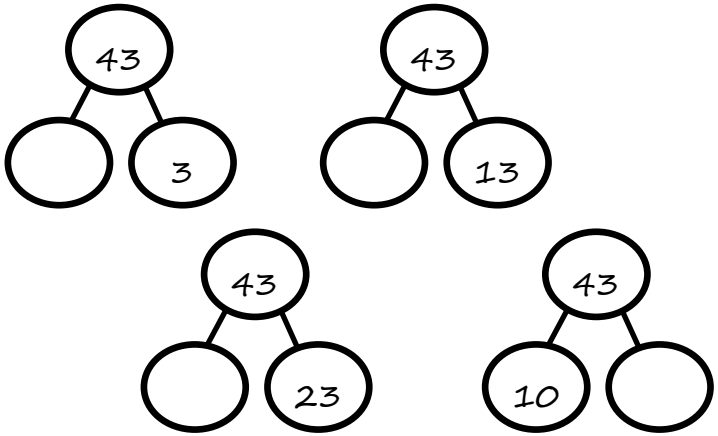
iv)

60 + 3	63
20 + 43	30 + 23

Create your own odd one out puzzle involving partitioning 2-digit numbers in different ways.

Partition some numbers of your own into a multiple of ten and 'the rest'.

Partition 43:



Now try these:

64 = __ + 54

64 = __ + 34

64 = 50 + __

64 = __ + 44

64 = 40 + __

64 = __ + 4

What do you notice?

What do you notice?

Partition some numbers of your own into a multiple of ten and 'the rest'.

3

ArithmeKit 2

Partition a 2-digit number in different ways

Colin says, "There are 5 ways of partitioning a 2-digit number into tens and the rest."

When is this true?

Do you agree with Colin?

Using practical resources, convince yourself

32 + 20 = 10 + 42

Convince Coco

24 + 30 = 40 + 14

Fill in the missing digits to partition 46.

46	
14	□□

46	
2□	1□

46	
□	4□

□□		
□	3□	8

Can you do it using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 once each?

Create your own bar model diagrams for other numbers.

4

ArithmeKit 2

Use known facts to 10 to derive other facts

Find the matching pairs by starting with a known fact.

17 + 5 =	20
45 + 5 =	22
34 + 6 =	31
12 + 8 =	
26 + 4 =	50
32 + 7 =	29
25 + 6 =	40
13 + 8 =	21
34 + 7 =	30
23 + 6 =	41

What's missing?

Create your own matching pairs problem using facts to 10

What's missing? Fill in the numbers.

If 7 + 3 = 10 then 7 + 4 = ☐

If 6 + 4 = 10 then 6 + 5 = ☐

If 3 + 7 = 10 then ☐ + 7 = 11

If 4 + 6 = 10 then ☐ + 6 = 11

What do you notice?

If 7 + 3 = 10 then 70 + 30 = ☐

If 6 + 4 = 10 then 60 + 40 = ☐

If 3 + 6 = 9 then 30 + ☐ = 90

If 4 + 5 = 9 then 40 + ☐ = 90

What do you notice?

4

ArithmeKit 2

Use known facts to 10 to derive other facts

Coco thinks that when you add two numbers, if one gets bigger and the other gets smaller the total stays the same.

Is this ever true?

What could you try first?

Put a digit in each box to make the statements true:

If 8 + 2 = 10 then □0 + 20 = 100

If □ + 4 = 10 then 60 + 40 = 100

If □ + □ + □ = 10 then □0 + □0 + □0 = 100

If 2 + □ = 9 then □0 + 70 = □□

If □ + □ = 9 then □0 + □0 = □□

Is there only one way to solve this problem?

Can you do it using all the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 at least once each?

Create your own missing digit problem.

Using practical resources and jottings, convince yourself if

5 + 5 = 10 then 5 + 6 = 11

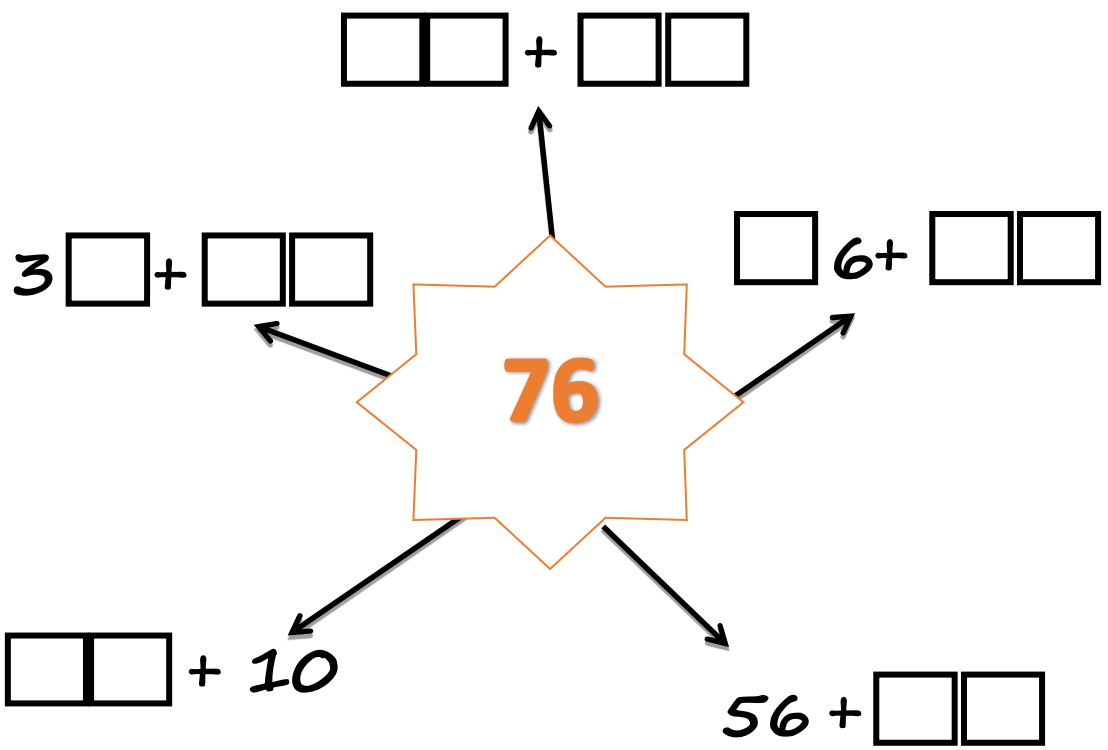
Convince Colin 7 + 4 = 11

5

ArithmeKit 2

Add multiples of 10 to a 2-digit number

Fill in the missing digits in several different ways:



Calculate the missing numbers:

23 + 30 = ☐

43 + 30 = ☐

13 + 40 = ☐

53 + 20 = ☐

23 + 50 = ☐

33 + 20 = ☐

What do you notice?

14 + ☐ = 54

34 + ☐ = 54

24 + ☐ = 74

44 + ☐ = 74

34 + ☐ = 74

24 + ☐ = 54

What do you notice?

5

ArithmeKit 2

Add multiples of 10 to a 2-digit number

Colin says, "When you add 40 to a 2-digit number the tens digit increases by 4"

When is this true?

Do you agree with Colin?

Using a number line, convince yourself

28 + 40 = 68

Using concrete resources, convince Coco that, 17 + 50 = 67

Put a digit in each box to make the statements true:

□□ + □□ = □4

□□ + 40 = □7

39 = 2□ + □0

Is there only one way to solve this problem?

Can you do it using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 once each?

Create your own missing digit problem.

ArithmeKit 2

Add a single digit number to a 2-digit number using known facts

Find the matching pairs:

34 + 7	62
64 + 7	53
55 + 8	61
46 + 6	
54 + 7	41
56 + 6	43
	63
44 + 7	71
36 + 6	42
45 + 8	51

What's missing?

Create your own matching pairs problem.

Add 7 to each of these numbers:

24 54 74 34 64

What do you notice?

Now add 7 to each of these numbers:

25 55 75 35 65

What do you notice?

Try adding 7 to other numbers.

6

ArithmeKit 2

Add a single digit number to a 2-digit number using known facts

Coco thinks to add 7 to a 2-digit number it is best to split it into 5 and 2

Always true?

Sometimes true?

Never true?

Put a digit in each box to make the statements true:

□□ + □ = 2□

□6 + □ = 4□

1□ = 1□ + □

Is there only one way to solve this problem?

Can you do it using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 once each?

Create your own missing digit problem.

Using known facts, convince yourself

38 + 6 = 44

Using known facts, convince Colin

57 + 8 = 65

7

ArithmeKit 2

Use rounding to add near multiples of 10

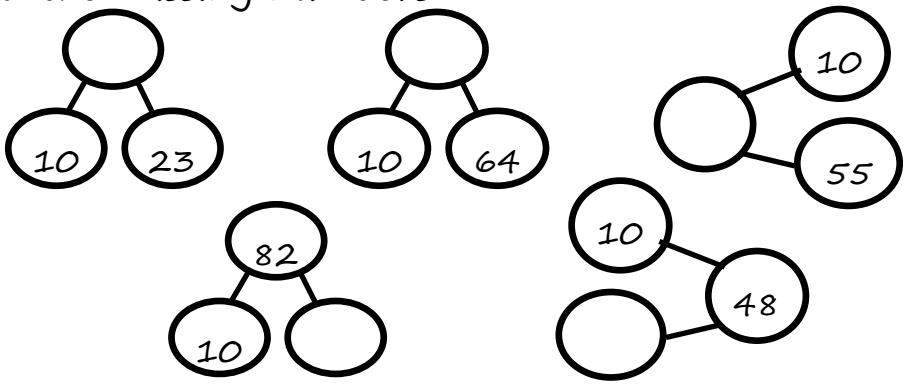
For which calculations would rounding to a near multiple of 10 be a useful strategy?

15 + 9	26 + 25	24 + 19	16 + 11
23 + 17	22 + 9	59 + 15	48 + 13
9 + 13	56 + 39	36 + 29	23 + 69

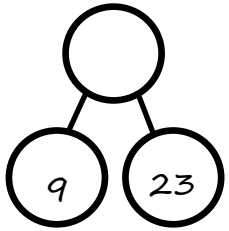
Useful	Not Useful

Create other calculations that rounding to a near multiple of 10 would be a useful strategy to solve.

Find the missing numbers:



Now add 9 to the same numbers:



What do you notice?

Add 20 to these numbers:

23 64 72 38 55

Now add 19 to the same numbers.

What do you notice?

Add 20 then add 19 to some other numbers.

7

ArithmeKit 2

Use rounding to add near multiples of 10

Colin says, "When you add 9 to a two digit number the tens get bigger."

Can you find 5 examples when this is not true?

Can you find 5 examples when this is true?

Using practical resources, convince yourself

26 + 9 = 26 + 10 − 1

Convince Coco that

35 + 9 = 35 + 10 − 1

Put a digit in each box to make the statements true:

5□ + □0 = □3 so 53 + □9 = 7□

46 + 2□ = 6□ so 46 + 19 = 6□

7□ +2□ = 98 so □8 + □9 = □7

□5 + □0 = 95 so □5 + □9 = 9□

Is there only one way to solve this problem?

Can you do it using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 at least once each?

Create your own missing digit problem.

ArithmeKit 2

Partition the second number to add 10s then 1s

Find the matching pairs:

17 + 15 =	50
45 + 25 =	32
34 + 26 =	80
32 + 18 =	
46 + 34 =	70
32 + 17 =	69
22 + 16 =	60
33 + 28 =	61
34 + 27 =	38
43 + 26 =	61

What's missing?

Create your own matching pairs problem using adding tens then ones.

Fill in the missing numbers:

37 + 12 = 37 + 10 + ☐ = ☐

37 + 13 = 37 + 10 + ☐ = ☐

37 + 14 = 37 + ☐ + ☐ = ☐

37 + 15 =

Now try these:

27 + 22 = 27 + 20 + ☐ = ☐

27 + 23 =

27 + 24 =

27 + 25 =

48 + 32 = 48 + 30 + ☐ = ☐

48 + 33 =

48 + 34 =

48 + 35 =

What do you notice?

8

ArithmeKit 2

Partition the second number to add 10s then 1s

Coco thinks the best way to add 36 and 27 is to start on 36, add the tens then the ones.

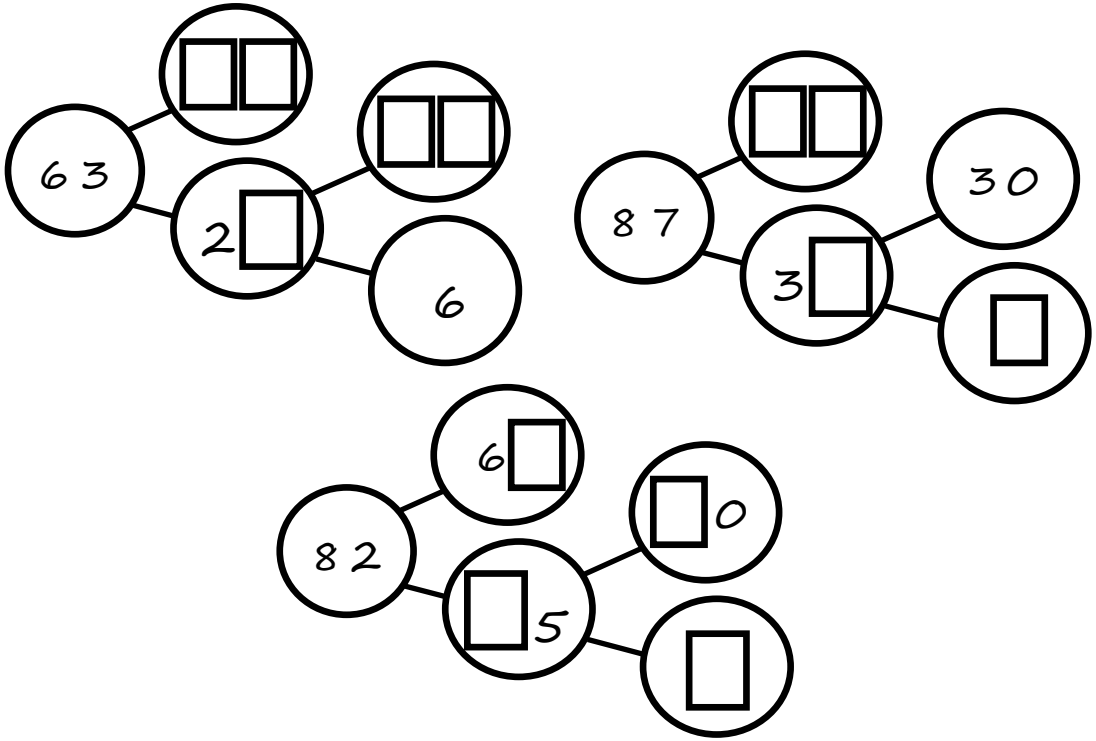
Do you agree with Coco?

What other ways could you try?

Adding tens then ones to 46, using resources, convince yourself 46 + 27 = 73

Using a number line convince Colin that 35 + 27 = 62

Put a digit in each box to make the statements true:



Is there only one way to solve this problem?

Can you do it using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 at least once each?

Create your own missing digit problem.

Partition and recombine to add

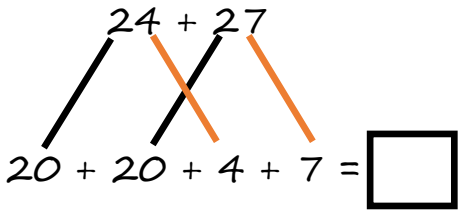
Find the matching pairs:

34 + 27 =	40+50+6+5
46 + 58 =	40+50+8+7
27 + 36 =	30+20+4+7
	50+30+8+3
38 + 57 =	40+50+6+8
48 + 57 =	30+50+7+4
24 + 37 =	30+50+8+7
37 + 54 =	
38 + 53 =	20+30+7+6
37 + 56 =	30+50+7+6

What's missing?

Create your own matching pairs problem using partitioning and recombining to add.

Fill in the missing number:



Use partitioning and recombining for these:

34 + 37 =

44 + 47 =

24 + 57 =

34 + 47 =

What do you notice?

44 + 37 =

24 + 67 =

34 + 57 =

24 + 47 =

What do you notice?

ArithmeKit 2

Partition and recombine to add

Colin says, "When you add two 2-digit numbers you get a 1 in the ones column."

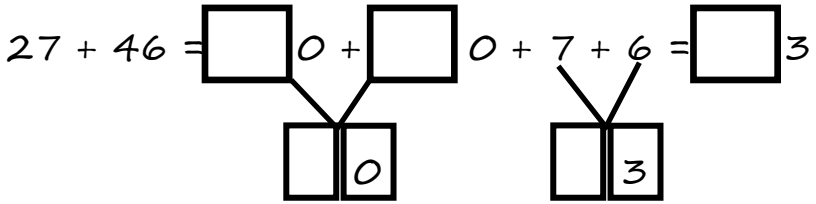
What do all the true examples have in common?

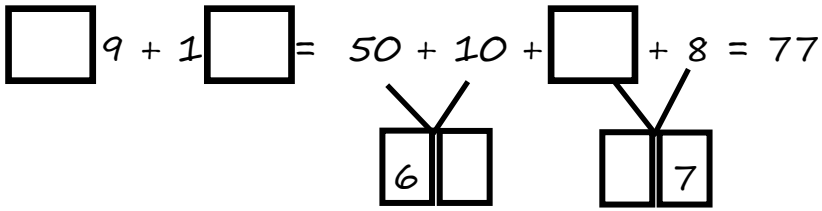
Can you find examples where this is not true?

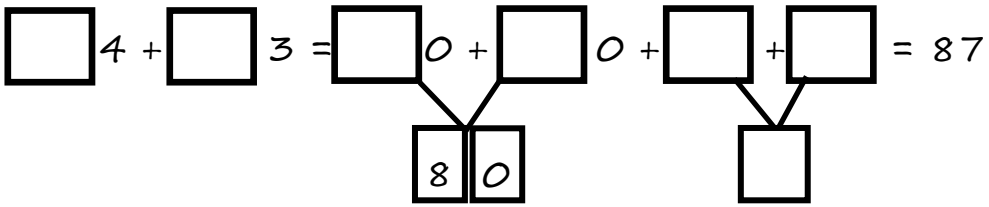
Using practical resources and partitioning convince Coco that

37 + 54 = 91

Put a digit in each box to make the statements true:







Is there only one way to solve this problem?

Can you do it using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 at least once each?

Create your own missing digit problem.

ArithmeKit 2

Use known facts to 10 to derive other facts

Find the matching pairs by using known facts:

17 - 5 =	51
46 - 5 =	44
38 - 6 =	12
57 – 6 =	22
79 – 6 =	32
49 – 5 =	41
68 – 5 =	72
	63
69 – 5 =	73
78 – 6 =	

What's missing?

Create your own matching pairs problem using known facts.

Fill in the missing numbers:

If 10 - 6 = 4 then 11 - 6 = ☐

If 10 - 8 = 2 then 11 - 8 = ☐

If 10 – 7 = 3 then 11 – 7 = ☐

If 10 – 4 = 6 then 11 – 4 = ☐

What do you notice?

If 9 - 4 = 5 then 19 - 4 = ☐

If 9 - 6 = 3 then 19 – 6 = ☐

If 9 – 7 = 2 then 29 – 7 = ☐

If 9 – 5 = 4 then 39 – 5 = ☐

What do you notice?

If 8 – 3 = 5 then 80 – 30 = ☐

If 8 – 6 = 2 then 80 – 60 = ☐

If 8 – 4 = 4 then 80 – 40 = ☐

If 8 – 7 = 1 then 80 – 70 = ☐

What do you notice?

10

ArithmeKit 2

Use known facts to 10 to derive other facts

Coco thinks if you subtract one more, then the answer is or more.

Do you agree with Coco?

Can it ever be true?

Using practical resources convince Colin

79 – 5 = 74

Can you use different resources?

Put a digit in each box to make the statements true:

□□ - □ = 22

36 - □ = □□

1□ = 1□ - □

2□ = 29 - 5

Is there only one way to solve this problem?

Can you do it using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 once each?

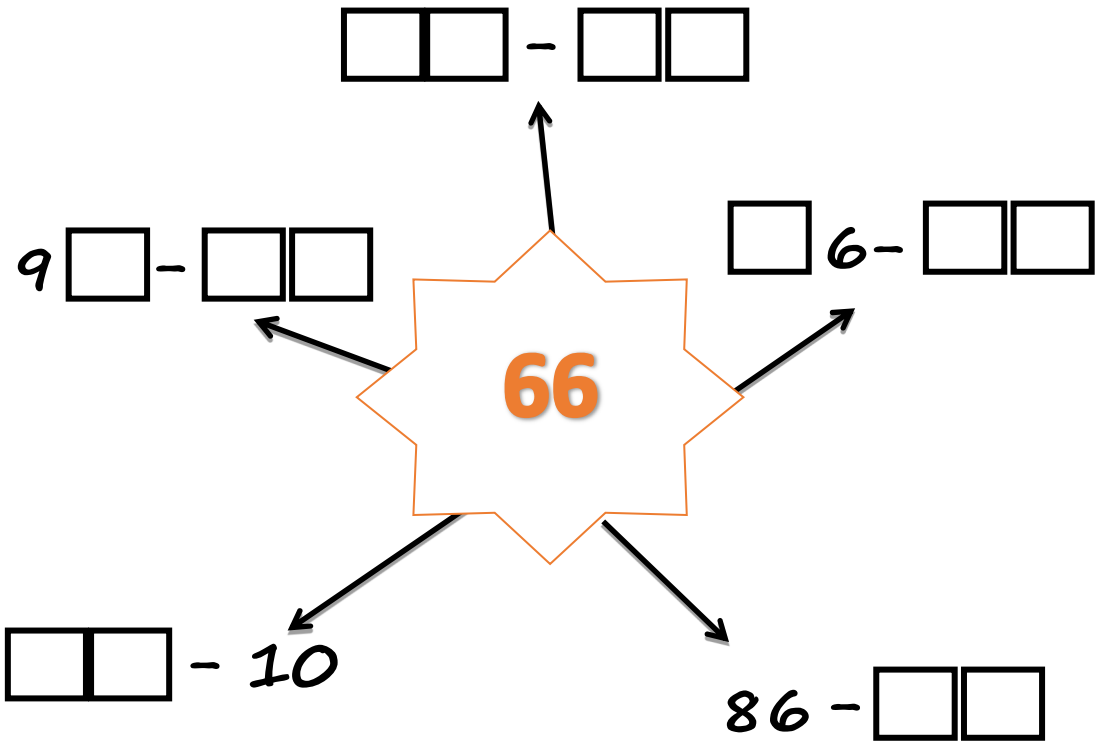
Create your own missing digit problem.

11

ArithmeKit 2

Subtract multiples of 10 from a 2-digit number

Fill in the missing digits in several different ways:



Calculate the missing numbers:

43 - 30 = □

83 - 30 = □

63 - 40 = □

53 - 20 = □

73 - 50 = □

53 - 30 = □

What do you notice?

84 - □ = 54

94 - □ = 54

84 - □ = 74

94 - □ = 74

74 - □ = 54

64 - □ = 54

What do you notice?

Try subtracting multiples of 10 from your own numbers.

11

ArithmeKit 2

Subtract multiples of 10 from a 2-digit number

Colin says, "When you subtract a multiple of 10 from a 2-digit number the ones digit does not change."

Is this always true?

Show Colin using resources.

Using practical resources convince yourself that 54 – 30 = 24

Convince Coco that the best way to do 73 – 40 is to count back in tens.

Put a digit in each box to make the statements true:

41 – 3□ = 1□

□□ – □0 = 14

□□ – 40 = 17

38 = □□ – □0

Is there only one way to solve this problem?

Can you do it using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 once each?

Create your own missing digit problem.

12

ArithmeKit 2

Subtract a single digit number from a 2-digit number using number facts

Find the matching pairs:

25 – 8 =	19
37 – 6 =	17
39 – 6 =	26
27 – 9 =	27
	22
35 – 8 =	
29 – 7 =	29
34 – 6 =	31
28 – 9 =	33
36 – 7 =	28

What's missing?

Create your own matching pairs problem involving subtraction of a single digit from a 2-digit number.

Subtract 8 from each of these numbers:

24 54 74 34 64

What do you notice?

Now subtract 8 from each of these numbers:

25 55 75 35 65

What do you notice?

Try subtracting 8 from other numbers.

12

ArithmeKit 2

Subtract a single digit number from a 2-digit number using number facts

Coco thinks you bridge through a multiple of 10 when you subtract a single digit number from a 2-digit number.

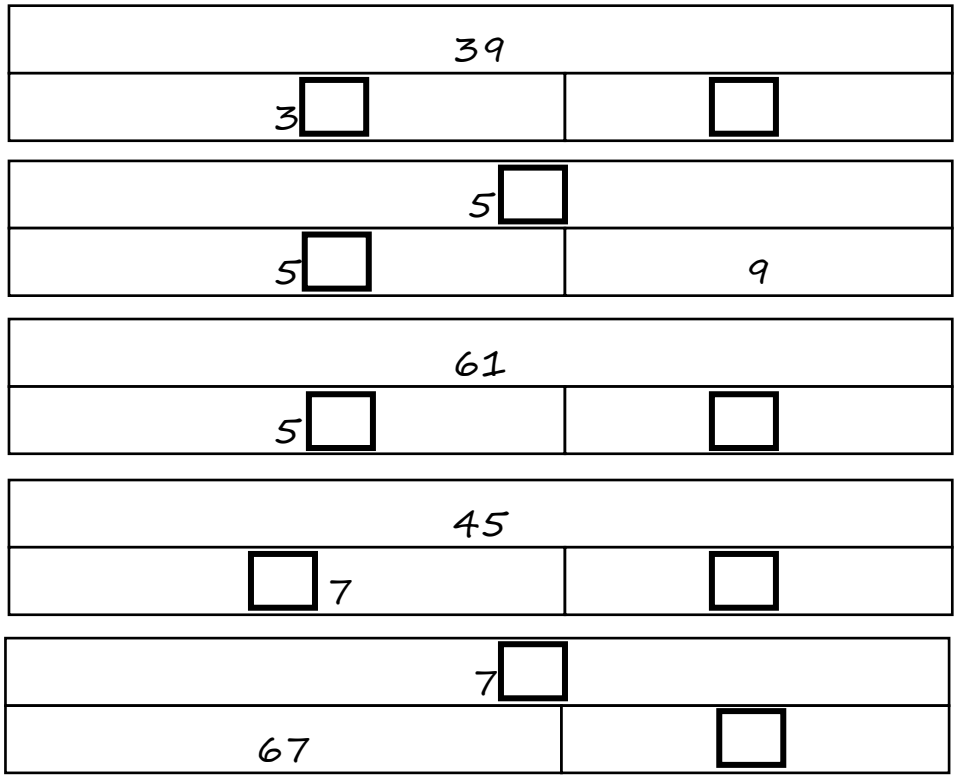
When is it not true?

When is it true?

Colin thinks 36 – 8 = 32 because 8 – 6 = 2

Use Base 10 equipment or Place Value counters to convince Colin he is incorrect.

Put a digit in each box to make these bar models correct:



Is there only one way to solve this problem?

Can you do it using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 once each?

Create your own missing digit problem.

13

ArithmeKit 2

Find the difference between two numbers

Find the matching pairs:

31 - 27	28
32 - 17	6
45 - 39	8
45 - 38	4
68 - 50	7
	11
58 - 30	
72 - 58	15
64 - 56	14
55 - 46	9

What's missing?

Create your own matching pairs problem involving the difference between numbers.

List five pairs of single digit numbers with a difference of 2

What do you notice?

Now list five pairs of teen numbers with a difference of 2

What do you notice?

Write some of your pairs as calculations.

13

ArithmeKit 2

Find the difference between two numbers

Colin says, "If the difference between two numbers is even then both the numbers were odd."

Find examples where this is not true.

Find examples where this is true.

Using an empty number line, convince Coco that

47 – 28 = 37 – 18

Find the missing digits to make these calculations equal:

8 □ - □□ = □

4 8 - □□ = 2 8 - □ 5

□□ - 7 □ = 7 7 - 6 0

Is there only one way to solve this problem?

Can you do it using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 once each?

Create your own missing digit problem.

14

ArithmeKit 2

Partition the second number to subtract 10s then 1s

Match the calculations:

37 – 12 =	37 – 10 – 2
	37 – 10 + 2
44 – 17 =	44 – 10 + 7
	44 – 10 – 7
42 – 13 =	42 – 10 – 3
	42 – 10 + 3
54 – 17 =	54 – 10 – 7
	54 – 10 + 7

Write the missing calculations:

	34 – 10 – 3
	56 – 10 – 7
	73 – 10 – 8
	37 – 10 – 9

Create your own matching pairs problem.

Fill in the missing numbers:

34 – 12 = 34 – 10 – ☐ = ☐

34 – 13 = 34 – 10 – ☐ = ☐

34 – 14 = 34 – 10 – ☐ = ☐

34 – 15 =

24 – 12 = 24 – 10 – ☐ = ☐

24 – 13 =

24 – 14 =

24 – 15 =

What do you notice?

43 – 12 = 43 – 10 – ☐ = ☐

43 – 13 =

43 – 14 =

43 – 15 =

14

ArithmeKit 2

Partition the second number to subtract 10s then 1s

Coco thinks that when you subtract ten more, the answer stays the same.

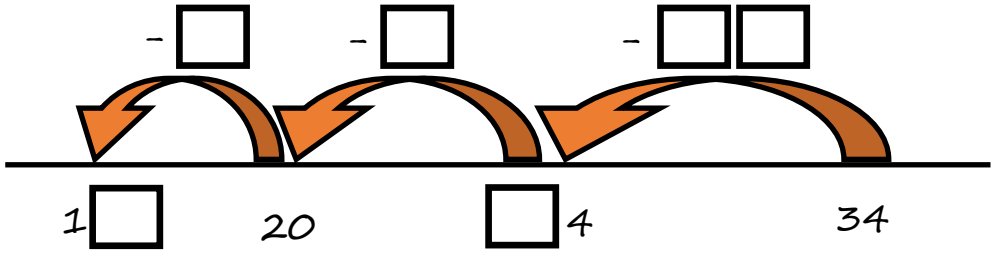
What could you try first?

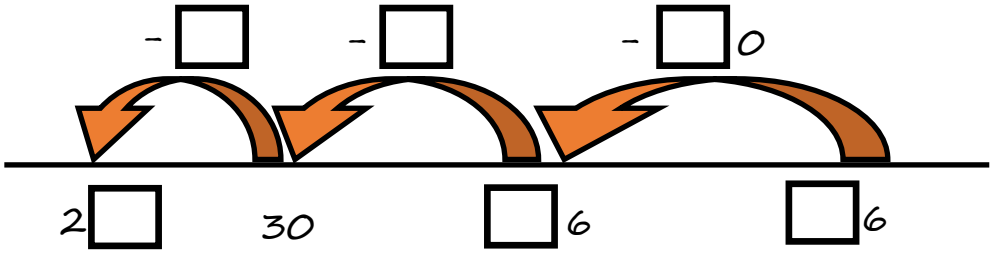
Is it ever true?

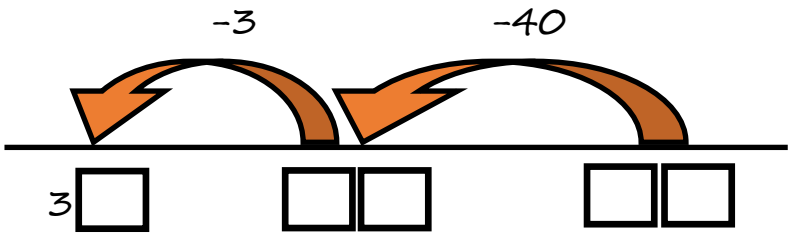
Using practical resources and jottings, convince Colin that,

$73 - 18 = 73 - 10 - 8$

Put a digit in each box to make these correct.:







Write the calculations for each one.

Can you do them another way?

15

ArithmeKit 2

Use rounding to subtract near multiples of 10

Match the calculations:

37 – 9 =	37 – 10 – 1
	37 – 10 + 1
66 – 9 =	66 – 10 + 1
	66 – 10 – 1
42 – 9 =	42 – 10 – 1
	42 – 10 + 1
54 – 9 =	54 – 10 – 1
	54 – 10 + 1

Write the missing calculations:

	34 – 10 + 1
	56 – 10 + 1
	73 – 10 + 1
	37 – 10 + 1

Create your own matching pairs problem.

Subtract 10 from all these numbers:

64 53 75 81 43

Now subtract 9 from these numbers:

64 53 75 81 43

What do you notice?

Subtract 20 from all these numbers:

34 63 45 71 83

Now subtract 19 from these numbers:

34 63 45 71 83

What do you notice?

Subtract 20 then subtract 19 from some other numbers.

15

ArithmeKit 2

Use rounding to subtract near multiples of 10

Colin says, "To subtract 18 you cannot subtract 20 then add 2"

When is this a good method?

Is this true?

Using practical resources and jottings, convince Coco that

$45 - 9 = 45 - 10 + 1$

and not

$45 - 9 = 45 - 10 - 1$

Put a digit in each box to make the statements true:

□4 − 20 = □4 so 84 − □9 = □5

□6 − 30 = □6 so □6 − 29 = □7

63 − □0 = □3 so 63 − □8 = □□

58 − 2□ = 38 so 58 − 19 = 3□

Is there only one way to solve this problem?

Can you do it using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 at least once each?

Create your own missing digit problem.

16

ArithmeKit 2

Recall and use multiplication and division facts for the 2 times table

Find the matching pairs:

2 × 2	1
2 × 5	16
0 × 2	6 × 2
8 ÷ 2	4
14 ÷ 2	9
24 ÷ 2	11
	7
8 × 2	4
2 ÷ 2	
22 ÷ 2	5 × 2

What's missing?

Create your own matching pairs problem involving multiplication and division facts for the 2 times table.

Multiply these numbers by 2:

4 2 8

6 12 3

What do you notice?

Divide these numbers by 2:

20 10

16 8

What do you notice?

What happens if you divide 7 by 2?

16

ArithmeKit 2

Recall and use multiplication and division facts for the 2 times table

Coco thinks that multiplying by 2 is the same as doubling.

Is this true for larger numbers?

What happens when you double?

Put a digit in each box to make the statements true:

1□ ÷ 2 = □

□ × 2 = 14

□□ = □ × 2

6 ÷ □ = □

□ × 2 = 2□ ÷ 2

Is there only one way to solve this problem?

Can you do it using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 once each?

Create your own missing digit problem.

Using practical resources, convince yourself 2 × 8 = 8 x 2

Convince Colin that 22 ÷ 2= 11

17

ArithmeKit 2

Recall and use multiplication and division facts for the 10 times table

Find the matching pairs:

10 × 7	
6 × 10	4
10 × 10	12
10 ÷ 10	0
120 ÷ 10	70
90 ÷ 9	50
	11
10 × 0	60
40 ÷ 10	1
10 × 5	100

What's missing?

Create your own matching pairs problem involving multiplication and division facts for the 10 times table.

Multiply these numbers by 10:

6 12 3

4 2 8

What do you notice?

Divide these numbers by 10:

40 20 10

100 50

What do you notice?

What happens if you multiply 13 by 10?

17

ArithmeKit 2

Recall and use multiplication and division facts for the 10 times table

Colin says, "When you divide a number with 0 in the ones column by 10 you get a single digit answer."

Why does this happen?

When is it true?

Using practical resources, convince yourself 8 x 10 = 10 x 8

Convince Coco that

90 ÷ 10 = 45 ÷ 5

Put a digit in each box to make the statements true:

□0 ÷ □□ = 8

□ X 10 = □0 - 10

□0 ÷ 7 = 10

□ X 10 = □0 - □0

60 ÷ 10 = □

Is there only one way to solve this problem?

Can you do it using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 once each?

Create your own missing digit problem.

ArithmeKit 2

Recall and use multiplication and division facts for the 5 times table

Find the matching pairs:

5 × 3	2 × 5
35 ÷ 5	55
5 × 5	1
6 × 5	40
50 ÷ 5	5
5 × 8	30
5 × 11	3 × 5
0 × 5	7
5 ÷ 5	25

What's missing?

Create your own matching pairs problem involving multiplication and division facts for the 5 times table.

Multiply these numbers by 5:

6 12 4 2

3 7 5 9

What do you notice?

Divide these numbers by 5:

40 20 10

50 30

What do you notice?

What happens if you multiply 13 by 5?

18

ArithmeKit 2

Recall and use multiplication and division facts for the 5 times table

Coco thinks that when you multiply by 5 the answer is a multiple of 10

Show Coco using resources

When is it true?

Using practical resources, convince yourself 5 × 6 = 10 x 3

Convince Colin that 45 ÷ 5 = 9

Put a digit in each box to make the statements true:

□ × □□ = □□

□5 ÷ 5 = □

□ = □5 ÷ 5

5 × □ = 40

□□ ÷ 5 = □ × 5

Is there only one way to solve this problem?

Can you do it using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 at least once each?

Create your own missing digit problem.

Double numbers

Find the matching pairs:

Double 6	14
Double 8	22
Double 9	12
Double 15	26
Double 7	28
	16
Double 12	
Double 16	30
Double 11	18
Double 14	24

What's missing?

Create your own matching pairs problem involving doubles.

Choose some numbers and double them.

Make your numbers with resources. What do they look like when you double them?

i) Double 3

Double 8

ii) Double 13

Double 18

What do you notice?

iii) Double 23

Double 28

Double numbers

Colin says, "When you double an odd number, the answer can be odd or even."

Always true?

Sometimes true?

Never true?

Put a digit in each box to make the statements true:

Double □□ = □□

Double 14 = 2□

Double □5 = □□

Double 3□ = □0

Is there only one way to solve this problem?

Can you do it using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 once each?

Create your own missing digit problem.

Using practical resources, convince yourself double 25 is 50

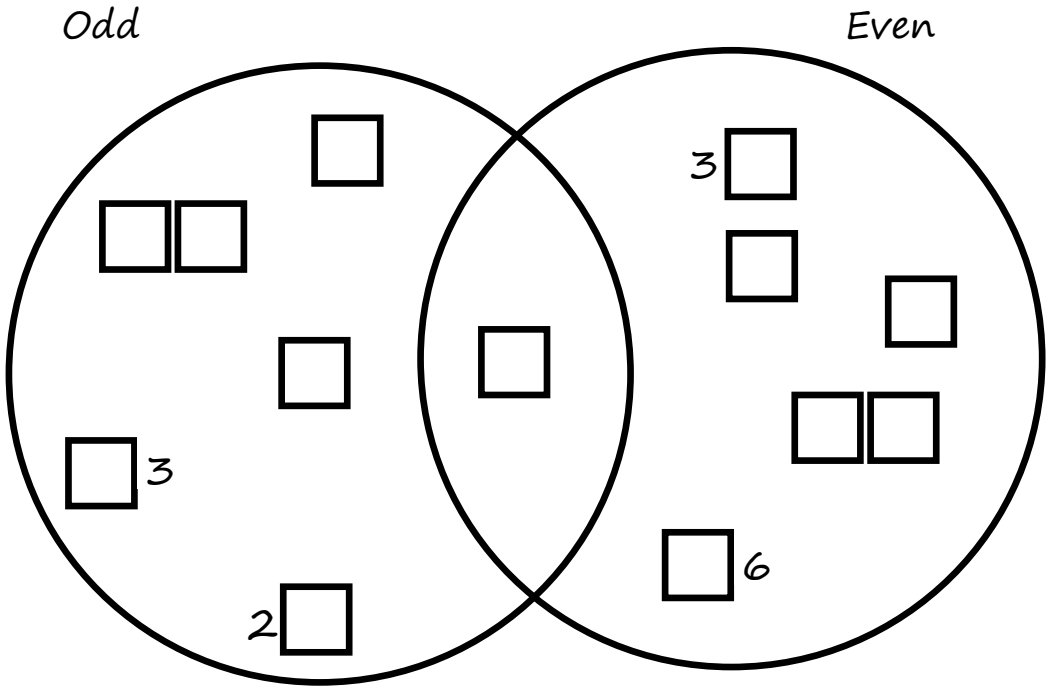
Convince Coco that double 17 is 34

20

ArithmeKit 2

Recognise odd and even numbers

Fill in the missing digits:



Solve the problem in different ways.

Using counters, make arrays for these numbers:

8 26 22 14

Now make arrays for these ones:

9 15 25 21

What do you notice?

Try making arrays for other odd numbers.

20

ArithmeKit 2

Recognise odd and even numbers

Coco thinks that 5 is an odd number so the 5 times table is made up of odd numbers.

Is this true?

Show Coco using resources

Using practical resources, convince yourself 13 is odd.

Convince Colin that 30 is even.

Put a digit in each box to make the statements true:

Even number, greater than 10, less than 20 ☐☐

Odd number, less than 10, greater than 5 ☐

Odd number between 20 and 30 ☐☐

Even number greater than 40 ☐☐

Largest odd number less than 10 ☐

Largest even number less than 10 ☐

Is there only one way to solve this problem?

Can you do it using just the digits 1, 2, 3, 4, 5, 6, 7, 8, and 9 once each?

Create your own missing digit problem.

21

ArithmeKit 2

Solve multiplication problems

Find the matching pairs:

2 x 5	How many sides on 5 squares?
10 x 3	
4 x 5	xxxx xxxx
3 x 5	How many eyes do 5 people have?
	10 + 10 + 10
5 x 3	How many sides on 5 triangles?

What's missing?

Create your own matching pairs.

Draw pictures to show these problems:

How many wheels on 2 cars?

How many corners on 10 triangles?

How many sides on 4 squares?

How many wheels on 5 tricycles?

Write the mathematical statements to describe the pictures.

Create a story to represent:

4 x 5 = 20

3 x 10 = 30

10 x 2 = 20

What do you notice?

21

ArithmeKit 2

Solve multiplication problems

Colin says,

"5 x 2 = 2 x 5"

Is this true?

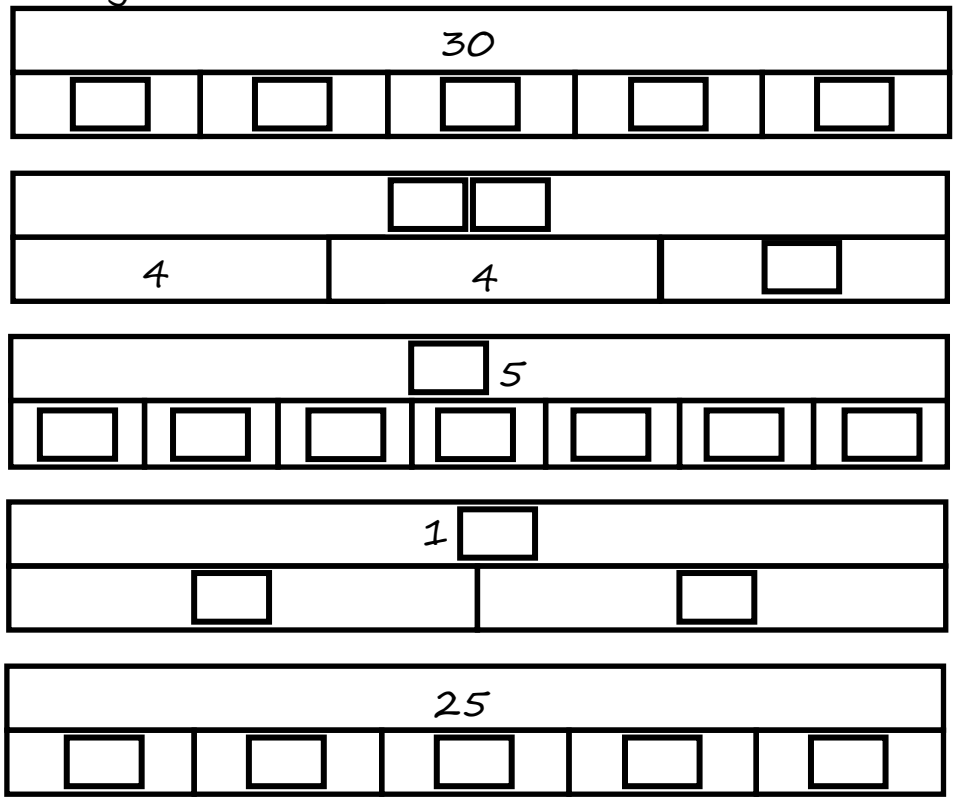
Show Colin using resources.

Using practical resources convince Coco that

4 x 5 = 5 x 4

And 4 x 5 = 2 x 10

Put a digit in each box to make the bar models true:



Is there only one way to solve this problem?

Can you do it using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 at least once each?

Create your own missing digit problem.

Halve numbers

Find the matching pairs:

6	Halve 14
8	Halve 22
9	Halve 12
	Halve 26
7	Halve 28
	Halve 16
12	
16	Halve 30
11	Halve 18
14	Halve 24

What's missing?

Create your own matching pairs involving halving.

Find half of 4

Find half of 24

Find half of 44

What do you notice?

Find half of 14

Find half of 34

Find half of 54

Make your numbers with resources. What do they look like when you halve them?

Try halving numbers with a 2 in the ones column.

What do you notice?

Halve numbers

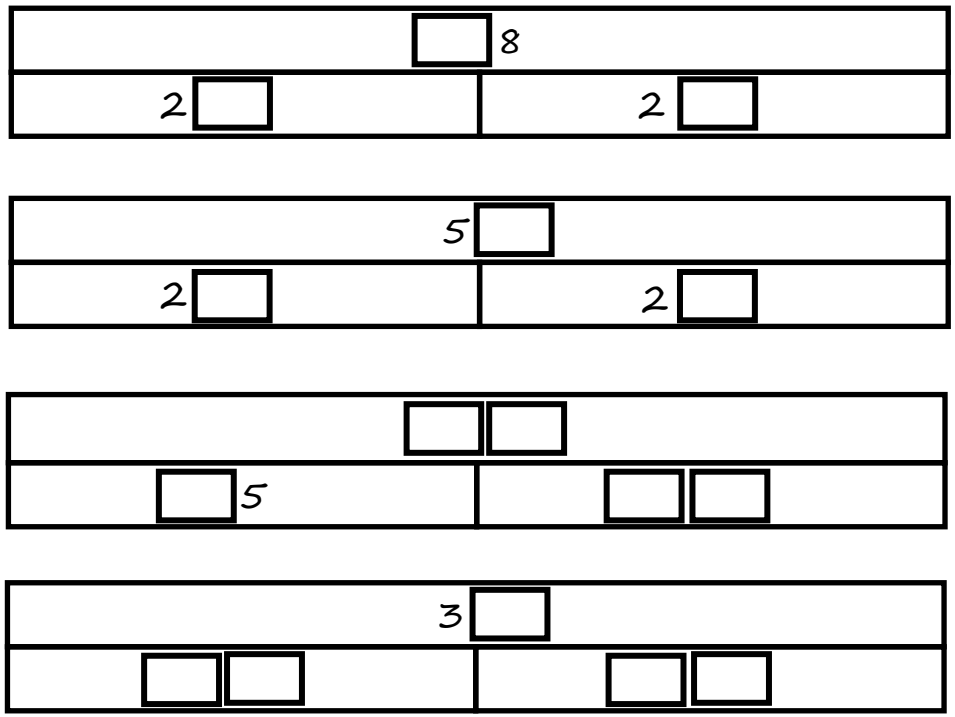
Coco thinks you can't halve an odd number.

What happens? Why?

Is this true?

Convince Colin that halving a number will give a smaller answer.

Put a digit in each box for these halving models:



Is there only one way to solve this problem?

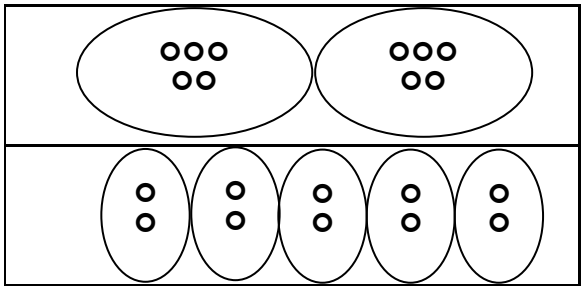
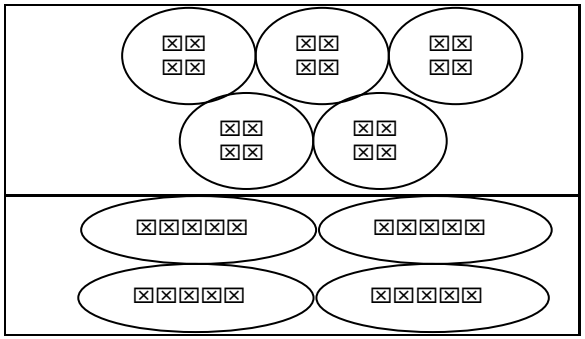
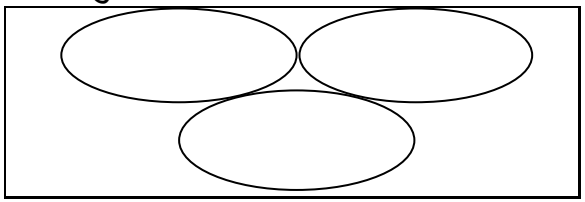
Can you do it using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 at least once each?

Create your own missing digit problem.

ArithmeKit 2

Use sharing to solve division problems

Match the problem to the correct picture:

10 apples shared equally between 2 bags	
20 apples shared equally between 4 bags	
__ apples shared equally between __ bags	

Make your own:

Using resources, can you share these equally?

12 between 4

20 between 4

10 between 4

18 between 4

What do you notice?

Now can you share these equally:

11 between 4

21 between 4

17 between 4

15 between 4

What do you notice?

Use sharing to solve division problems

Colin says, "Even numbers of counters can be shared equally between 4 with nothing left over."

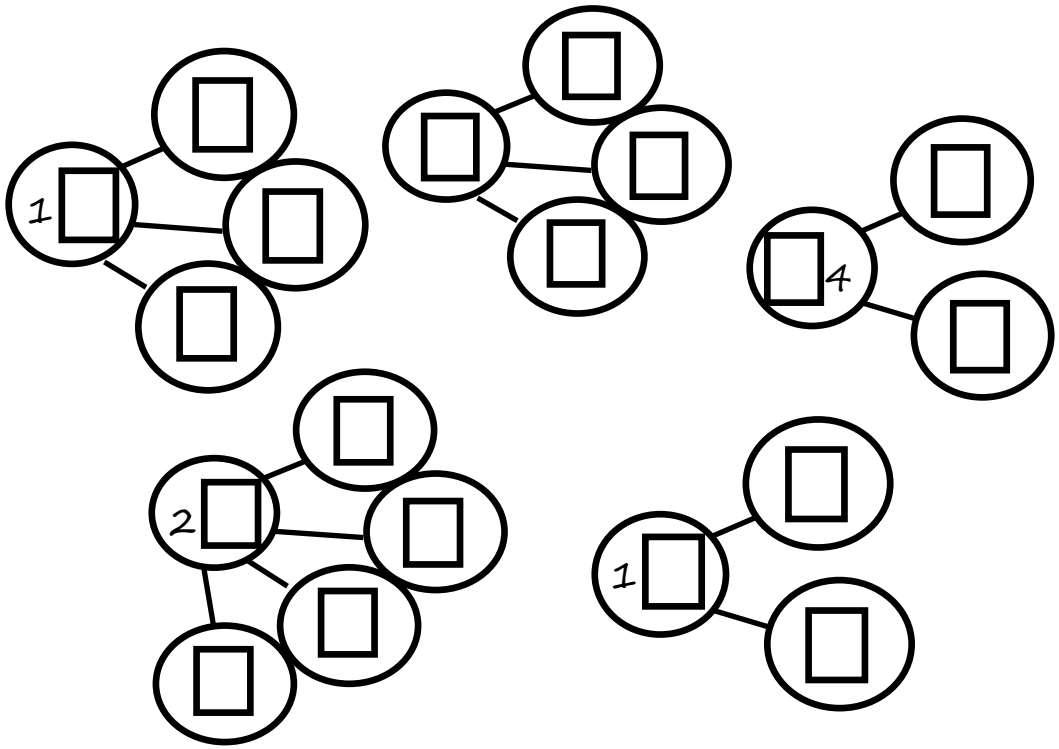
Why does this happen?

When is this true?

Using practical resources, convince yourself an even number can be shared equally between 2

Convince Coco an even number can be shared equally between 2

Sharing equally: put a digit in each box.



Is there only one way to solve this problem?

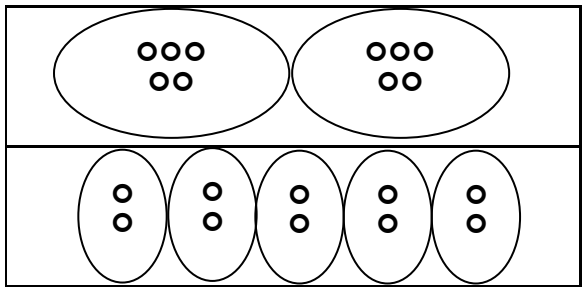
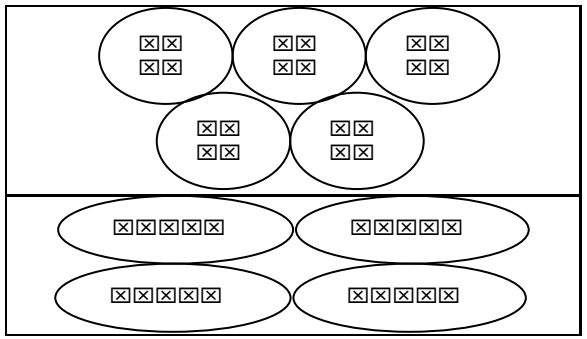
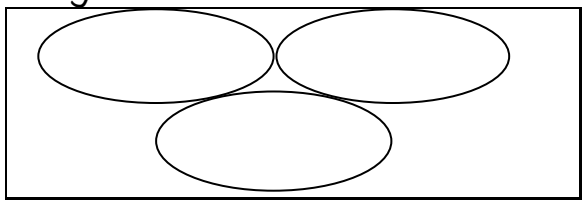
Can you do it using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 at least once each?

Create your own missing digit problem.

ArithmeKit 2

Use grouping to solve division problems

Match the problem to the correct picture:

10 apples in bags of 2	
20 apples in bags of 4	
Make your own: ___ apples in bags of ___	

Using resources, can you put:

12 into groups of 4?

20 into groups of 4?

10 into groups of 4?

18 into groups of 4?

What do you notice?

Now can you put:

11 into groups of 4?

21 into groups of 4?

17 into groups of 4?

15 into groups of 4?

What do you notice?

Use grouping to solve division problems

Coco thinks that 10 divided into groups of 2 is the same as 20 divided into groups of 4

Can you explain what happens?

What is the same/ different?

Using practical resources convince yourself any multiple of 10 can be grouped in 5s.

Convince Colin that any multiple of 10 can be grouped in 5s.

Put a digit in each box to make these statements true:

□ groups of 3 = 1□

2 groups of □ = 1□

9 groups of □ = 45

□ groups of □0 = 6□

5 groups of □ = □5

Is there only one way to solve this problem?

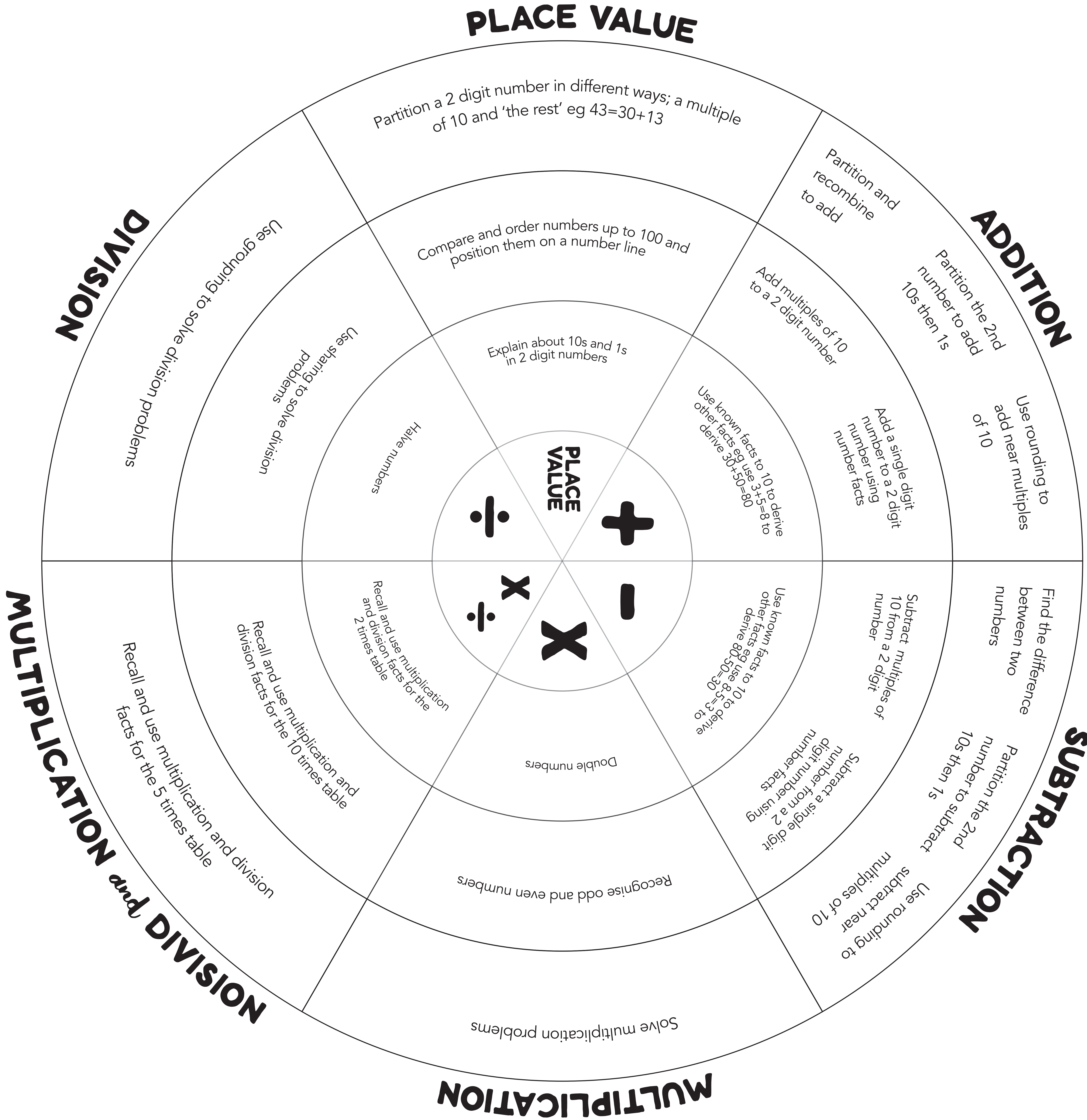
Can you do it using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 once each?

Create your own missing digit problem.

How am I doing?

	Objective	Can't do yet	Can do
1	Explain about 10s and 1s in 2 digit numbers		
2	Compare and order numbers to 100		
3	Partition a 2 digit number in different ways		
4	Use known facts to 10 to derive other facts		
5	Add multiples of 10 to a 2 digit number		
6	Add a single digit number to a 2 digit number using known facts		
7	Use rounding to add near multiples of 10		
8	Partition the second number to add 10s then 1s		
9	Partition and recombine to add		
10	Use known facts to 10 to derive other facts		
11	Subtract multiples of 10 from a 2 digit number		
12	Subtract a single digit number from a 2 digit number using number facts		
13	Find the difference between two numbers		
14	Partition the second number to subtract 10s then 1s		
15	Use rounding to subtract near multiples of 10		
16	Recall and use facts for the 2 times table		
17	Recall and use facts for the 10 times table		
18	Recall and use facts for the 5 times table		
19	Double numbers		
20	Recognise odd and even numbers		
21	Solve multiplication problems		
22	Halve numbers		
23	Use sharing to solve division problems		
24	Use grouping to solve division problems		

ARITHMECYCLE 2



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