

# Addition and Subtraction

## Mental addition and subtraction

### Objectives

#### Day 1

**Know number bonds to 8; Recognise that addition can be done in any order.**  
**Use number facts to add and subtract.**

#### Day 2

**Know number bonds to 9; Recognise that addition can be done in any order.**  
**Use number facts and place value to add and subtract.**

#### Day 3

**Relate addition and subtraction number facts.**  
**Add a single-digit number to a 2-digit number, bridging 10.**

#### Day 4

**Add three numbers, using number bonds to 10.**  
**Subtract a single-digit number from a 2-digit number, bridging 10.**

#### Day 5

**Add three numbers, using doubles and number bonds.**  
**Add three, four or five numbers, using doubles and number bonds.**

# Addition and Subtraction

## Mental addition and subtraction

### Short Mental Workouts

**Day 1**

**Pairs to 6**

**Day 2**

**Pairs to 7**

**Day 3**

**Pairs to 10**

**Day 4**

**Pairs to 10**

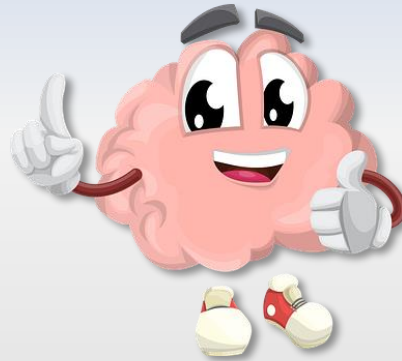
**Day 5**

**Doubles**



# Addition and Subtraction

## Mental addition and subtraction

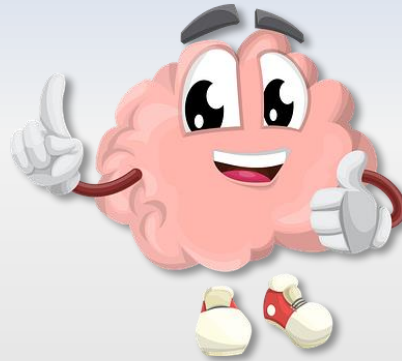


### Short Mental Workout

Pairs to 6

# Addition and Subtraction

## Mental addition and subtraction

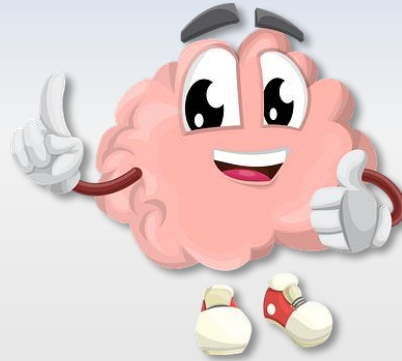


### Short Mental Workout

Pairs to 7

# Addition and Subtraction

## Mental addition and subtraction

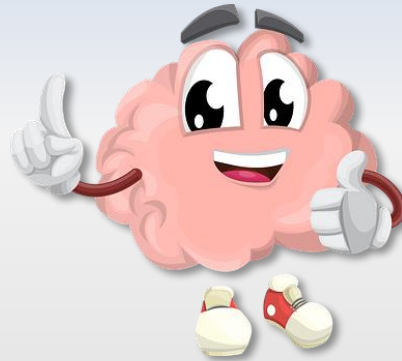


### Short Mental Workout

Pairs to 10

# Addition and Subtraction

## Mental addition and subtraction

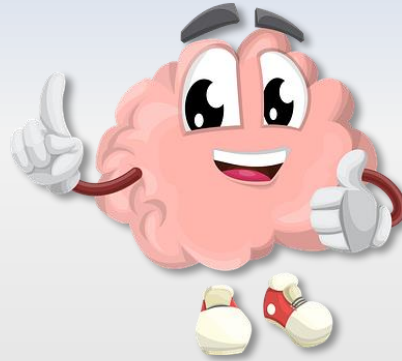


### Short Mental Workout

Pairs to 10

# Addition and Subtraction

## Mental addition and subtraction



### Short Mental Workout

#### Doubles

# Addition and Subtraction

## Mental addition and subtraction

### Objectives

#### Day 1

**Know number bonds to 8; Recognise that addition can be done in any order.**

**Use number facts to add and subtract.**



Day 1: **Know number bonds to 8; Recognise that addition can be done in any order.**  
**Use number facts to add and subtract.**

Look at this  
number  
sentence...

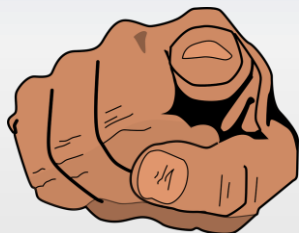
$$3 + \square = 8$$

Talk to your partner...  
What is the missing  
number?  
How will you find out?



Day 1: **Know number bonds to 8; Recognise that addition can be done in any order.**  
Use number facts to add and subtract.

# Did you...



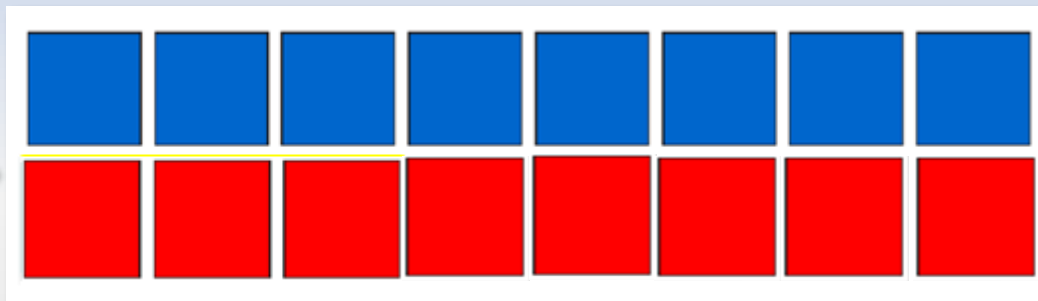
...**count on** from 3  
to get to 8?

...look at your  
fingers?

...do it a different  
way?

Day 1: **Know number bonds to 8; Recognise that addition can be done in any order.**  
Use number facts to add and subtract.

We can also show  
this sum using  
cubes.



How many more  
red cubes are  
needed to make  
8?

$$3 + 5 = 8$$

Day 1: **Know number bonds to 8; Recognise that addition can be done in any order.**  
**Use number facts to add and subtract.**

Think back to  
the number  
sentence before.

$$3 + \boxed{5} = 8$$

What number  
should go in the  
box now?

$$5 + \boxed{3} = 8$$

Day 1: **Know number bonds to 8; Recognise that addition can be done in any order.**  
Use number facts to add and subtract.

5

3



3 and 5 are  
'special' number  
partners that make  
8:  
a **number bond**.

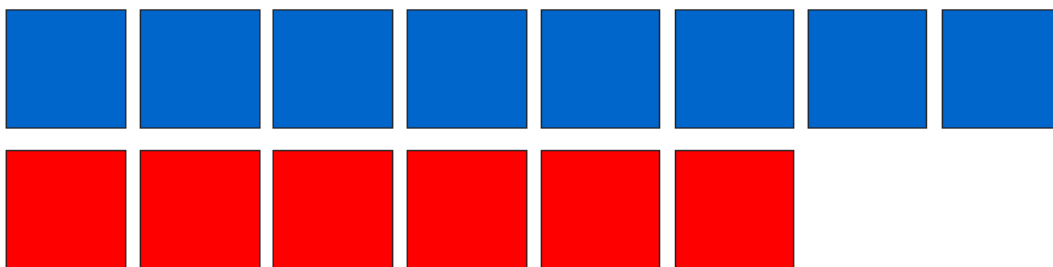
Addition can be done in  
any order because the  
two parts being added  
haven't changed, so must  
make the same whole.

$$3 + 5 = 8$$

$$5 + 3 = 8$$

# Day 1: Know number bonds to 8; Recognise that addition can be done in any order.

How many more to make 8?



$$6 + \boxed{2} = 8$$

How many more  
red cubes are  
needed to make  
8?

# Day 1: Know number bonds to 8; Recognise that addition can be done in any order.

How many more to make 8?

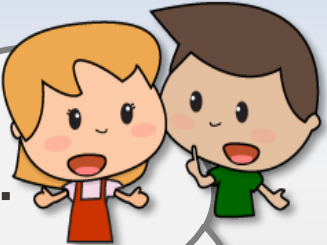


$$2 + \boxed{6} = 8$$

© Hamilton Trust

Now how many more red cubes are needed to make 8?

Day 1: **Know number bonds to 8; Recognise that addition can be done in any order.**  
**Use number facts to add and subtract.**



Talk to your partner.  
Can you find any  
other pairs of  
numbers that **total** 8?

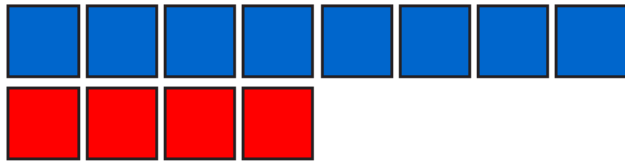
Take feedback and ask children to  
add their number sentence to a  
large class piece of paper.



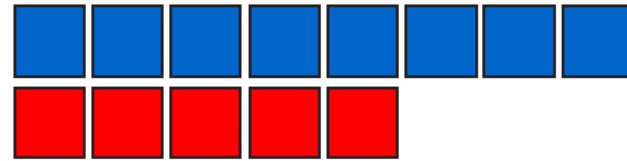
# How many more to make 8?

## Sheet 1

Draw the missing number of cubes and write the missing number in the number sentence below:



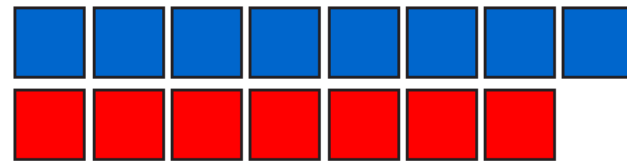
$$4 + \square = 8$$



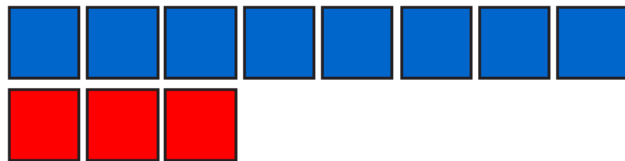
$$5 + \square = 8$$



$$2 + \square = 8$$



$$7 + \square = 8$$

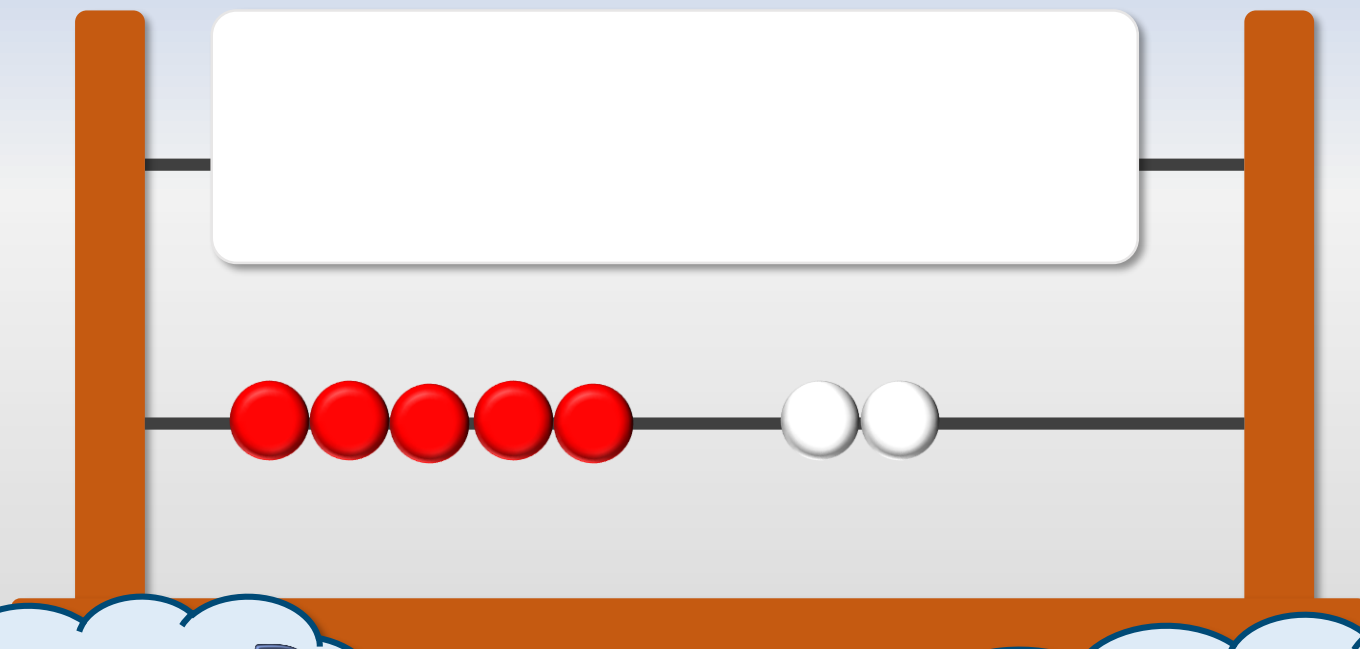


$$3 + \square = 8$$



$$\square + 1 = 8$$

## Day 1: Use number facts to add and subtract.

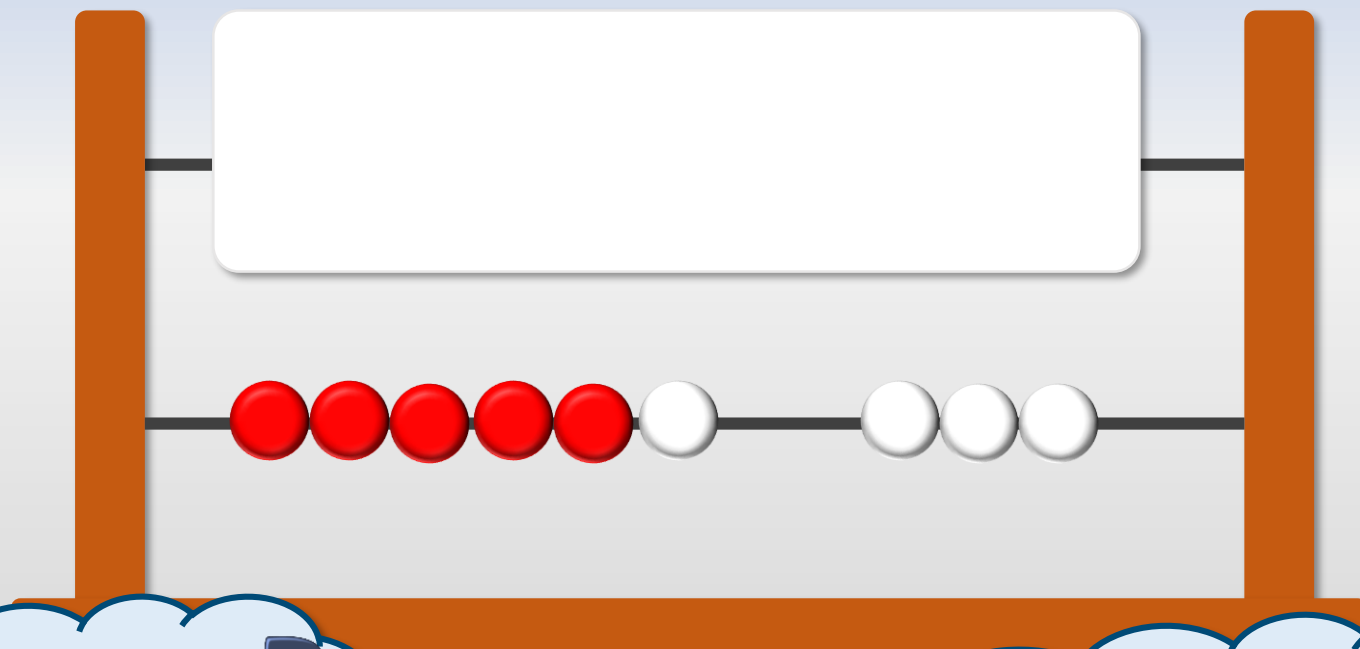


What is 5 add 2?

What is 15 add 2?

We only needed to know one number fact  $(5 + 2)$  to find  $15 + 2...$

## Day 1: Use number facts to add and subtract.

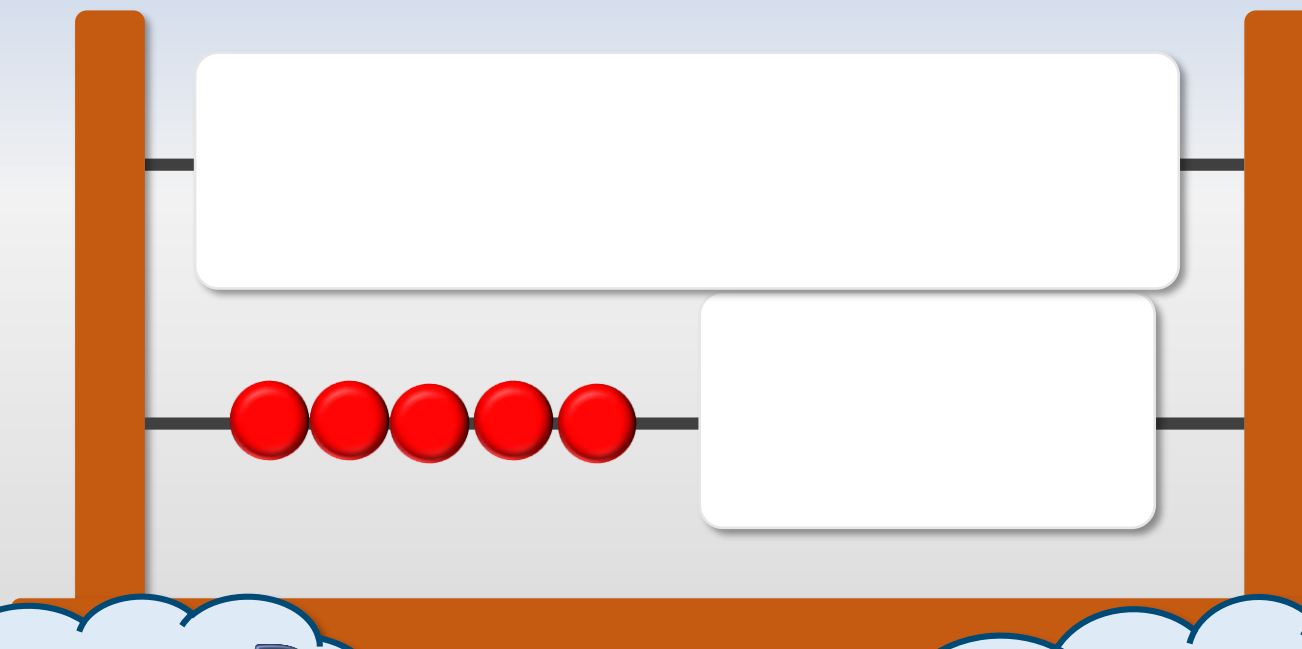


What is 6 add 3?

What is 16 add 3?

We only needed to know one number fact ( $6 + 3$ ) to find  $16 + 3$ .

## Day 1: Use number facts to add and subtract.



What is 5 take  
away 2?

?

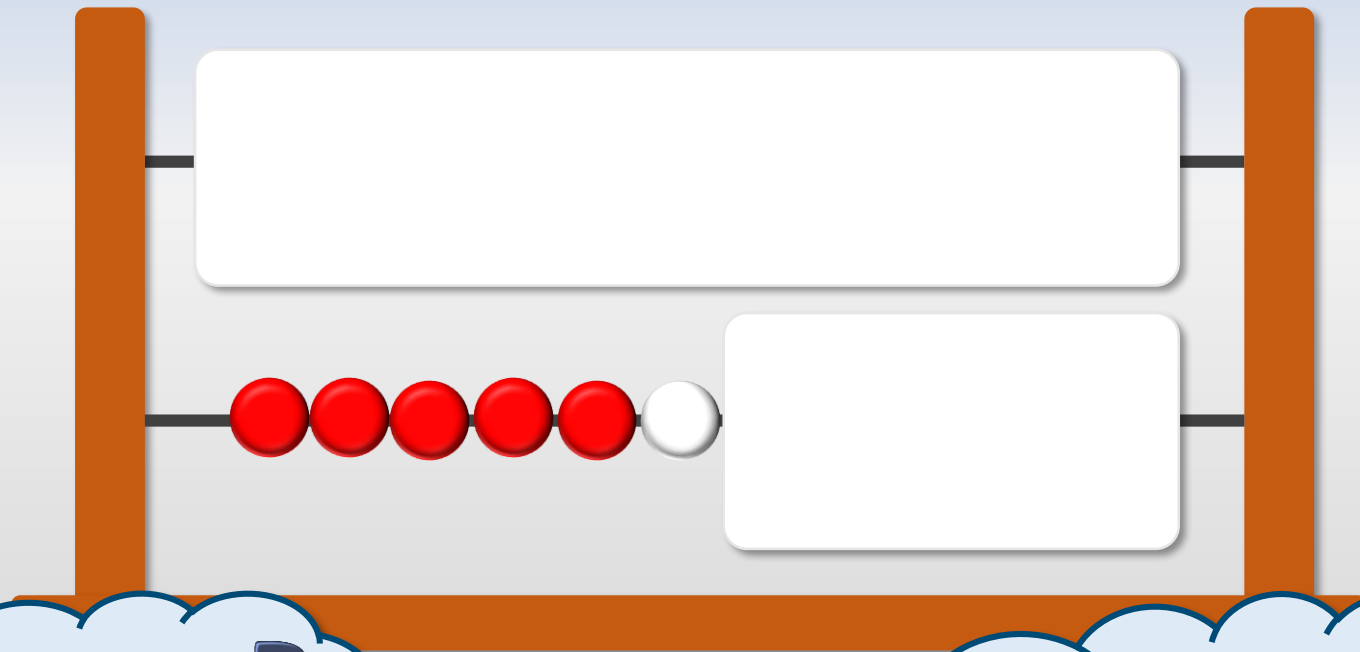
So what is 15  
take away 2?

?

If we know what  
 $5 - 2$  is, then we  
can use this fact  
to find  
 $15 - 2$ .

Day 1: Use number facts to add and subtract.

FINAL SLIDE for single Year teaching



What is 6 **take** away 3?

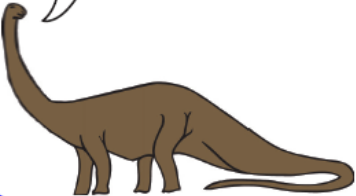
So what is 16 **take** away 3?

If we know what  $6 - 3$  is, then we can use this fact to find  $16 - 3$ .

# Creature calculations

## Sheet 2

Complete each animal's calculation.




13 + 6


My calculations

3 + 6 = 9


So, 13 + 6 = 19



15 + 4



27 - 4




12 + 7




36 - 5



11 + 6



13 + 4



14 + 6



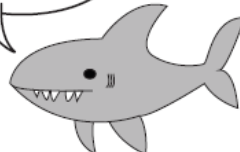
19 - 7




16 - 3



18 - 4



17 - 5



19 - 2

Challenge



# Addition and Subtraction

## Mental addition and subtraction

### Objectives

Day 2

**Know number bonds to 9; Recognise that addition can be done in any order.**

**Use number facts and place value to add and subtract.**

Day 2: **Know number bonds to 9; Recognise that addition can be done in any order.**  
**Use number facts and place value to add and subtract.**

$$35 + 3$$

$$27 - 7$$

$$30 + 5$$

$$46 + 6$$

$$27 - 5$$

$$56 + 3$$

$$99 - 3$$

**Y1:** What is  $5 + 3$ ?



Number facts

$$35 + 3$$

**Y2:** Can you see an addition where you could use this fact?





Day 2: **Know number bonds to 9; Recognise that addition can be done in any order.**  
**Use number facts and place value to add and subtract.**

$$27 - 7$$

$$30 + 5$$

$$46 + 6$$

$$27 - 5$$

$$56 + 3$$

$$99 - 3$$

**Y2:** Which strategies would you use to solve these calculations?



**Number facts**

$$35 + 3$$

$$27 - 5$$

We can use **number facts** to solve  $27 - 5$ .

**Place value**  
(we could show it with PV cards)

$$30 + 5$$

Day 2: **Know number bonds to 9; Recognise that addition can be done in any order.**  
**Use number facts and place value to add and subtract.**

$$27 - 7$$

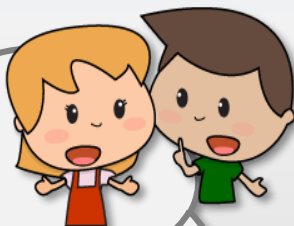
$$46 + 6$$

$$56 + 3$$

$$99 - 3$$

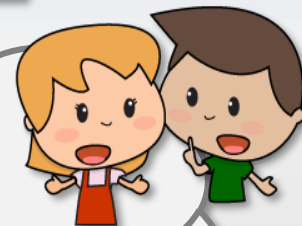
Talk to your partner.

Can see others where you would use a number fact?



Talk to your partner.

Can see others where you would use place value?



**Number facts**

$$35 + 3$$

$$27 - 5$$

$$99 - 3$$

$$46 + 6$$

$$56 + 3$$

**Place value**

(we could show it with PV cards)

$$30 + 5$$

$$27 - 7$$

## Four in a row

### Sheet 3

Work in pairs.

- Pick a question to solve. Write it in your book.
- Your partner checks it.
- If it is correct, place a counter on that square.
- Take turns answering questions.
- The aim of the game is to be the first to get 4 counters of the same colour in a row.

$21 + 3$	$76 - 6$	$66 - 3$	$90 + 9$	$20 + 5$	$47 + 3$
$22 + 6$	$97 - 3$	$44 + 4$	$33 + 6$	$49 - 5$	$65 - 3$
$64 - 4$	$40 + 5$	$92 + 6$	$19 - 5$	$23 + 5$	$60 + 1$
$80 + 3$	$57 - 3$	$34 - 4$	$23 + 3$	$77 - 5$	$27 - 6$
$78 - 6$	$30 + 9$	$40 - 5$	$10 + 6$	$38 - 8$	$22 + 5$
$35 + 5$	$65 - 5$	$92 - 2$	$59 - 4$	$42 + 3$	$100 - 10$

Day 2: **Know number bonds to 9; Recognise that addition can be done in any order.**

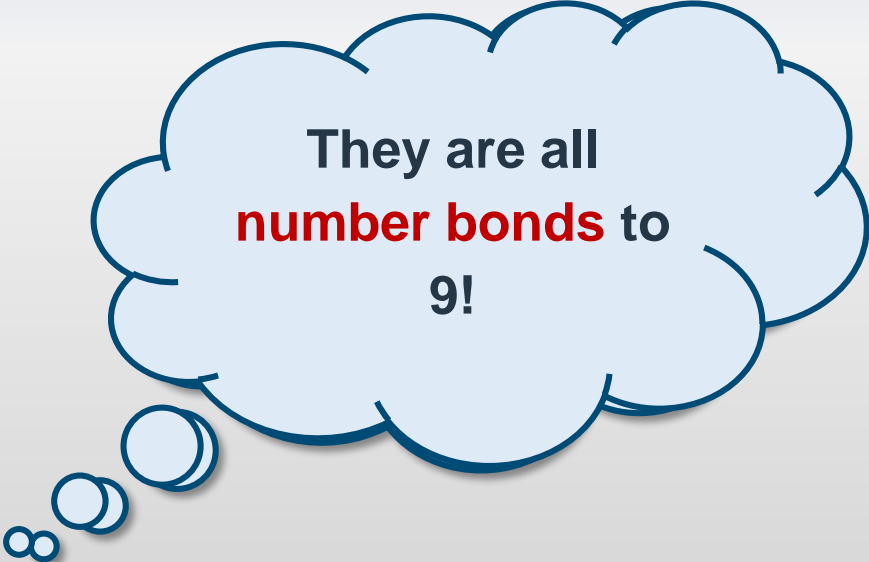
$$9 + 0$$

$$3 + 6$$

$$7 + 2$$

$$4 + 5$$

$$8 + 1$$



They are all  
**number bonds** to  
9!

Day 2: Know number bonds to 9; Recognise that addition can be done in any order.

$$9 + 0$$

$$3 + 6$$

$$7 + 2$$

$$4 + 5$$

$$8 + 1$$

Remember... Addition can be done in **any order** because the two parts being added haven't changed, so must make the same **total**.

Can we find any more number bonds to 9, using these same numbers?



Day 2: Know number bonds to 9; Recognise that addition can be done in any order.

$$9 + 0$$

$$0 + 9$$

$$3 + 6$$

$$6 + 3$$

$$7 + 2$$

$$2 + 7$$

$$4 + 5$$

$$5 + 4$$

$$8 + 1$$

$$1 + 8$$

We can use these  
to help write  
**subtraction** number  
bonds.

Day 2: Know number bonds to 9; Recognise that addition can be done in any order.

$$9 + 0$$

$$0 + 9$$

$$3 + 6$$

$$6 + 3$$

$$7 + 2$$

$$2 + 7$$

$$4 + 5$$

$$5 + 4$$

$$8 + 1$$

$$1 + 8$$

$$9 - 4 = \square$$

Can you use any of these number bonds to help find the missing number?



$$9 - 4 = 5$$



Yes! That works.

Use cubes to demonstrate.



Day 2: Know number bonds to 9; Recognise that addition can be done in any order.

$$9 + 0$$

$$0 + 9$$

$$3 + 6$$

$$6 + 3$$

$$7 + 2$$

$$2 + 7$$

$$4 + 5$$

$$5 + 4$$

$$8 + 1$$

$$1 + 8$$

$$9 - 2 = \square$$

What about this subtraction?  
Which number bond to 9 contains a 2?



Day 2: Know number bonds to 9; Recognise that addition can be done in any order.

$$9 + 0$$

$$0 + 9$$

$$3 + 6$$

$$6 + 3$$

$$9 - 2 = 7$$

$$7 + 2$$

$$2 + 7$$

$$4 + 5$$

$$5 + 4$$

$$8 + 1$$

$$1 + 8$$

Complete the  
number  
sentence with  
your partner.



**Day 2: Know number bonds to 9; Recognise that addition can be done in any order.**

$$9 + 0$$

$$0 + 9$$

$$3 + 6$$

$$6 + 3$$

$$7 + 2$$

$$2 + 7$$

$$4 + 5$$

$$5 + 4$$

$$8 + 1$$

$$1 + 8$$

Find more subtraction number bonds to 9 with your partner.



# Birthday number bond candles

## Sheet 1

How many more candles to make 9? Finish each number sentence.



2	+		=	9
---	---	--	---	---



5	+		=	
---	---	--	---	--



	+		=	
--	---	--	---	--



	+		=	
--	---	--	---	--



	+		=	
--	---	--	---	--



	+		=	
--	---	--	---	--



	+		=	
--	---	--	---	--



	+		=	
--	---	--	---	--



	+		=	
--	---	--	---	--

# Addition and Subtraction

## Mental addition and subtraction

### Objectives

Day 3

Relate addition and subtraction number facts.

Add a single-digit number to a 2-digit number, bridging 10.



Day 3: **Relate addition and subtraction number facts.** Add a single-digit number to a 2-digit number, bridging 10.

With a partner, write  
number bonds to 8  
on your whiteboard,  
e.g.

$$4 + 4 = 8.$$



These are all  
addition  
number

We can use these  
number facts to help  
us make subtraction  
number sentences  
too.

Day 3: **Relate addition and subtraction number facts.** Add a single-digit number to a 2-digit number, bridging 10.

Show children 6 pegs of one colour and 2 of another on a coat hanger.

If I take these 2  
pegs off, how  
many will be  
left?



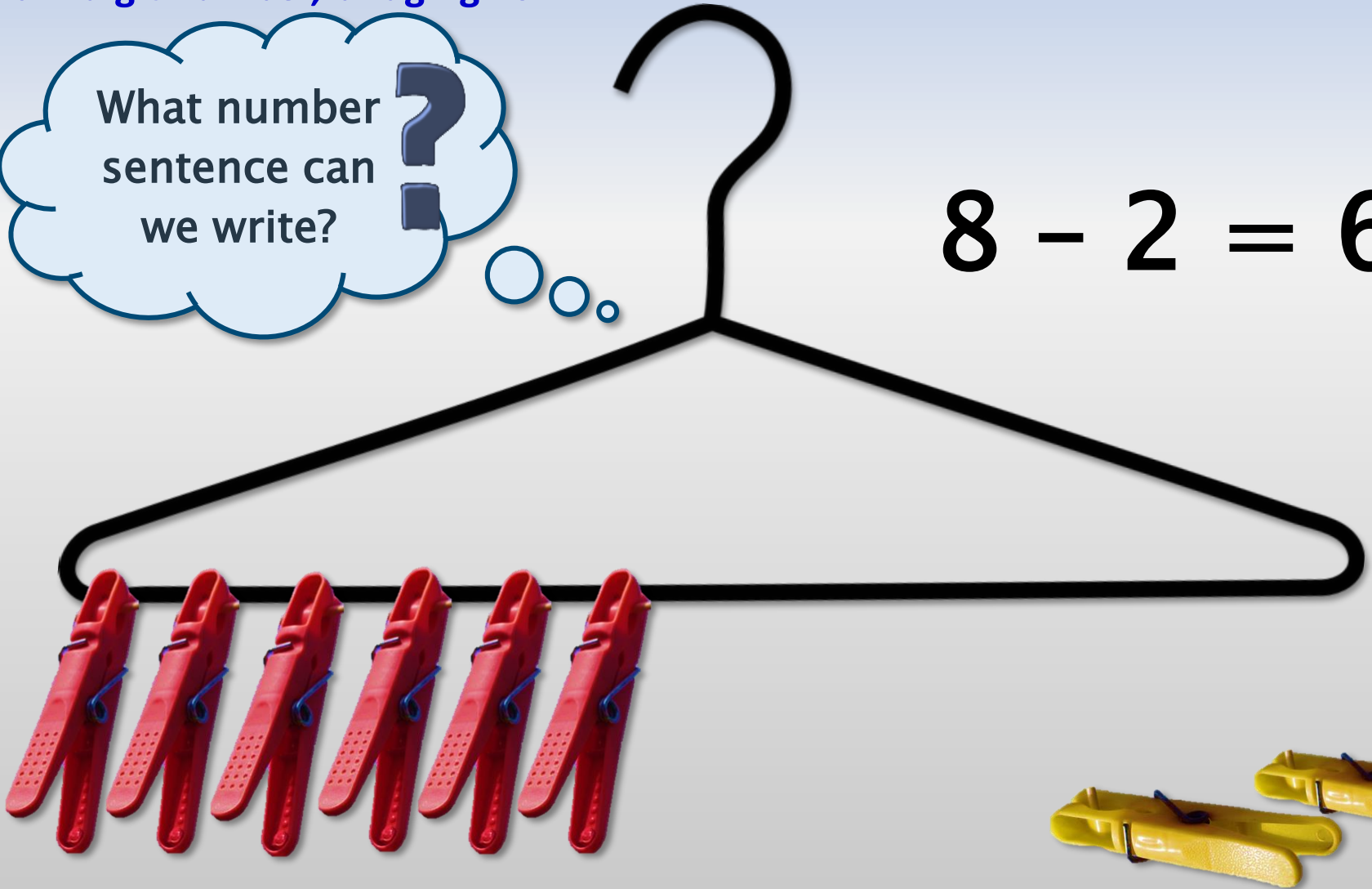
6

Day 3: **Relate addition and subtraction number facts.** Add a single-digit number to a 2-digit number, bridging 10.

What number sentence can we write?



$$8 - 2 = 6$$





Day 3: **Relate addition and subtraction number facts.** Add a single-digit number to a 2-digit number, bridging 10.

$$2 + 6 = 8$$

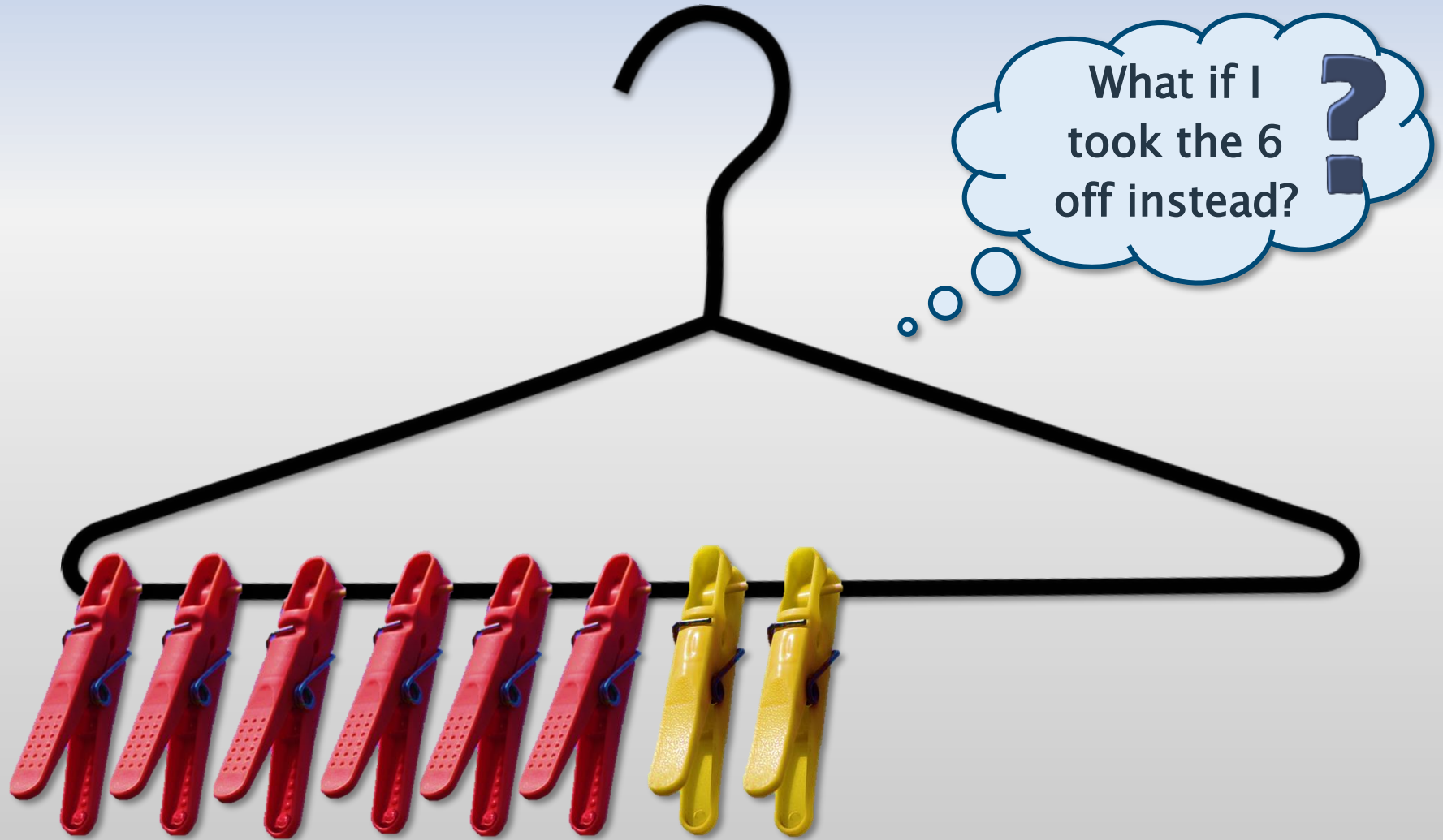
$$6 + 2 = 8$$

$$8 - 2 = 6$$

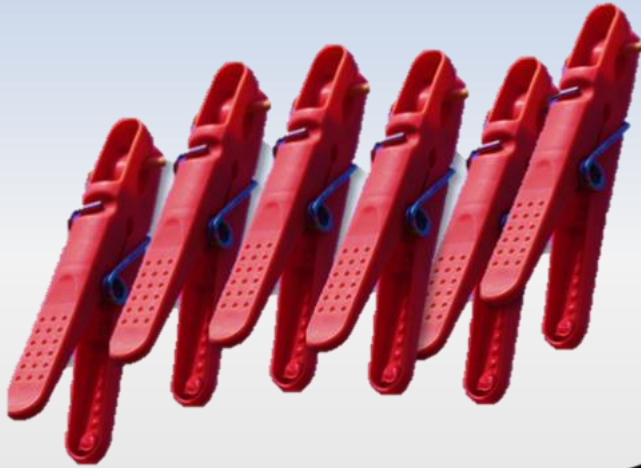
The numbers are the same as those in the addition number sentences.

They have just been moved around.

Day 3: **Relate addition and subtraction number facts.** Add a single-digit number to a 2-digit number, bridging 10.



Day 3: **Relate addition and subtraction number facts.** Add a single-digit number to a 2-digit number, bridging 10.



There are 2 left.



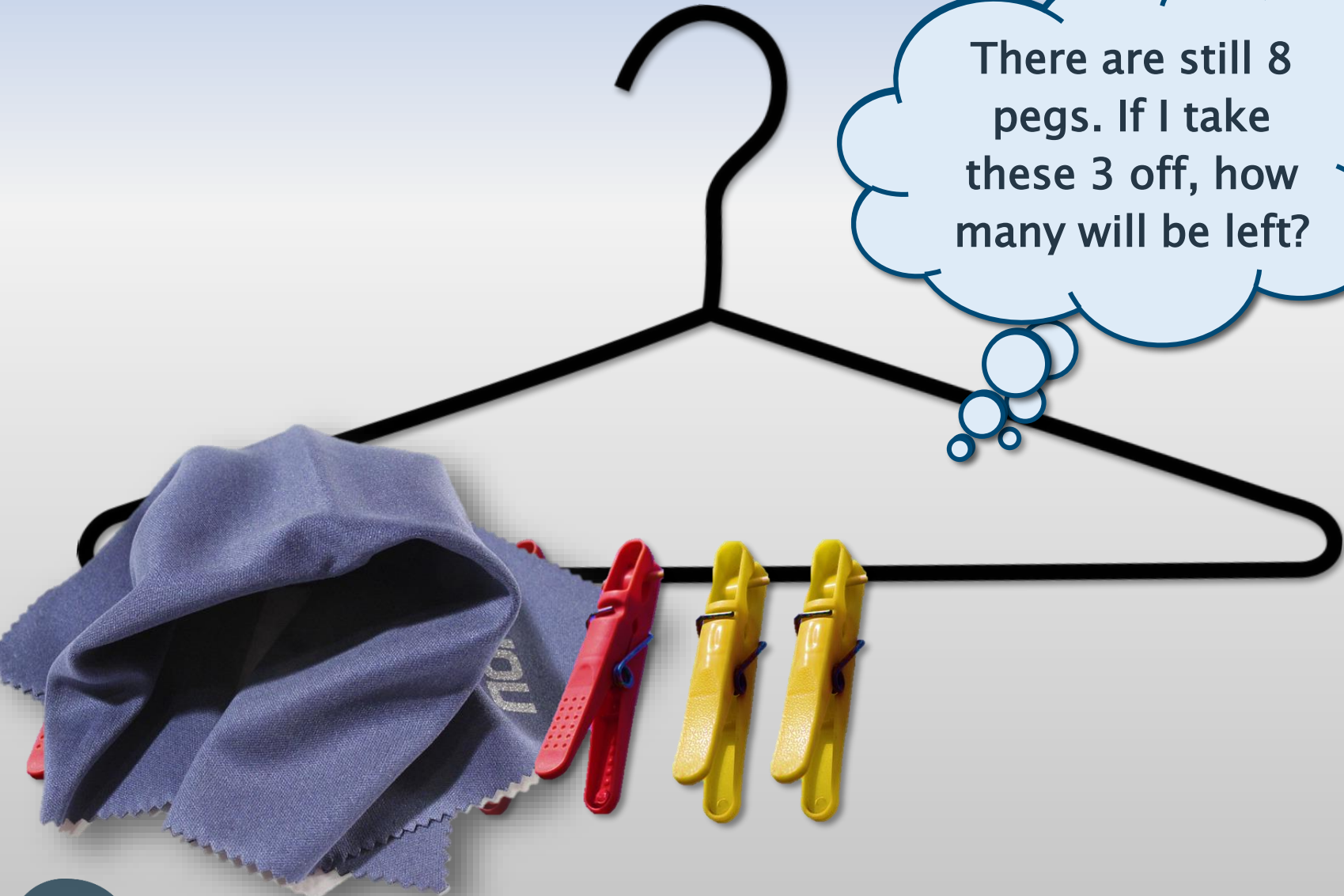
$$8 - 6 = 2$$

Day 3: **Relate addition and subtraction number facts.** Add a single-digit number to a 2-digit number, bridging 10.

There are still 8  
pegs. If I take  
these 3 off, how  
many will be left?



5

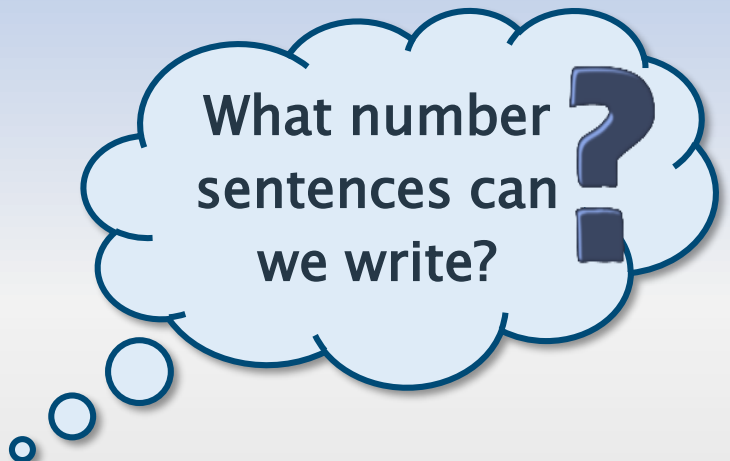


Day 3: **Relate addition and subtraction number facts.** Add a single-digit number to a 2-digit number, bridging 10.

$$8 - 3 = 5$$

$$5 + 3 = 8$$

$$3 + 5 = 8$$



What number sentences can we write?

Repeat, showing 8-2, 8-4, 8-5 and 8-7.

Encourage children to write subtractions by making connections to addition number facts.

## Relating addition and subtraction

### Sheet 2

Knowing addition facts can help us to work out subtraction facts.  
If we know  $3 + 4 = 7$ , then we know that  $7 - 3 = 4$ , or  $7 - 4 = 3$ .



$6 + 2 = 8$ , so  $8 - 2 = 6$  and  $8 - 6 = 2$

Work out each addition. Use it to create a subtraction number sentence.



$$\square + \square = 3$$

$$3 - \square = \square$$



$$\square + \square = 5$$

$$\square - \square = \square$$



$$\square + \square = \square$$

$$\square - \square = \square$$



$$\square + \square = \square$$

$$\square - \square = \square$$

## Relating addition and subtraction

### Sheet 3

Use each addition to create two subtractions.



$$\square + \square = \square$$

$$\square - \square = \square$$

$$\square - \square = \square$$



$$\square + \square = \square$$

$$\square - \square = \square$$

$$\square - \square = \square$$



$$\square + \square = \square$$

$$\square - \square = \square$$

$$\square - \square = \square$$

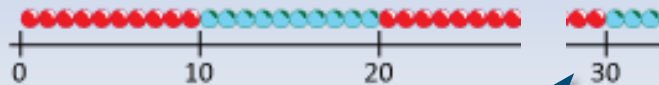


$$\square + \square = \square$$

$$\square - \square = \square$$

$$\square - \square = \square$$

## Day 3: Add a single-digit number to a 2-digit number, bridging 10.



See how 2 beads make 30, then 3 more beads make 33?

$$28 + 5 = 33$$

We are going to add 5 beads.

Let's call this strategy  
'**Target the 10s**'  
or **T10** for short...



## Day 3: Add a single-digit number to a 2-digit number, bridging 10.

This is how we  
record the **T10**  
strategy.

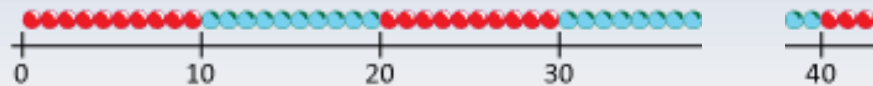
$$28 + 5 = \boxed{33}$$

A diagram showing the decomposition of the number 5 into 2 and 3. The number 5 is positioned above two boxes containing the numbers 2 and 3. Lines connect the 5 to the top of each box. A bracket is drawn to the left of the boxes, connecting the 2 and 3.

Step 1:  $28 + 2 = 30$

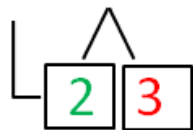
Step 2:  $30 + 3 = 33$

### Day 3: Add a single-digit number to a 2-digit number, bridging 10.



Let's add again,  
starting with 38  
beads.

$$38 + 5 = \boxed{43}$$



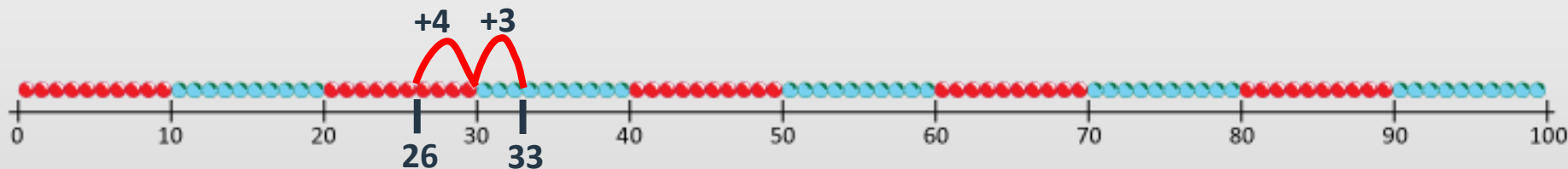
Step 1:  $38 + 2 = 40$

Step 2:  $40 + 3 = 43$

## Day 3: Add a single-digit number to a 2-digit number, bridging 10.

How many beads do we need to make 30?

We are going to find  $26 + 7$ .



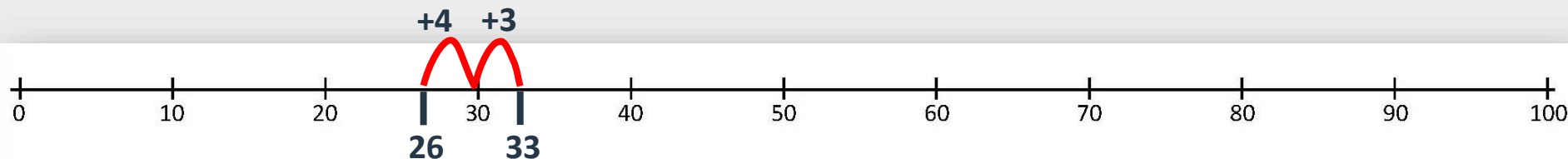
How many more do we need to add?

What is the answer?

### Day 3: Add a single-digit number to a 2-digit number, bridging 10.

We are going to calculate  $26 + 7$ .

How many beads do we need to make 30?



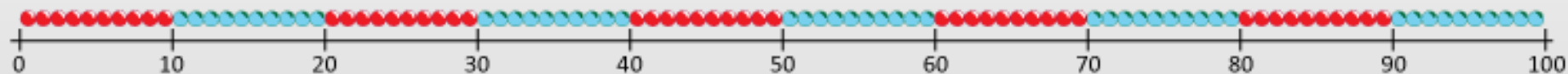
How many more do we need to add?

What is the answer?

Where is that on the line?

## Day 3: Add a single-digit number to a 2-digit number, bridging 10.

We are going to  
calculate  $45 + 7$ .



Draw a label  
after the 45<sup>th</sup>  
bead.

How many  
beads to the  
next 10?

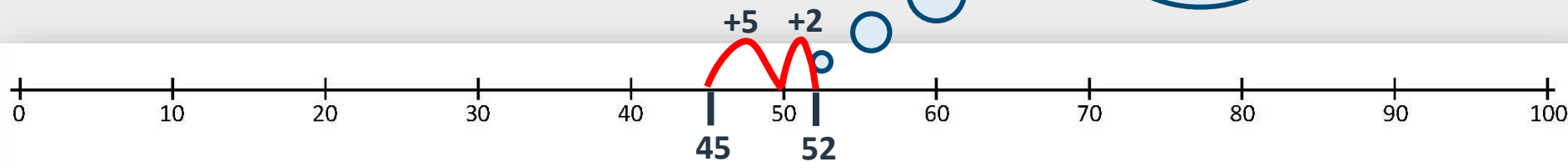
How many  
more do we  
need to add?

What is the  
answer?

## Day 3: Add a single-digit number to a 2-digit number, bridging 10.

How many beads do we need to make 50?

We are going to calculate  $45 + 7$ .



How many more do we need to add?

What is the answer?

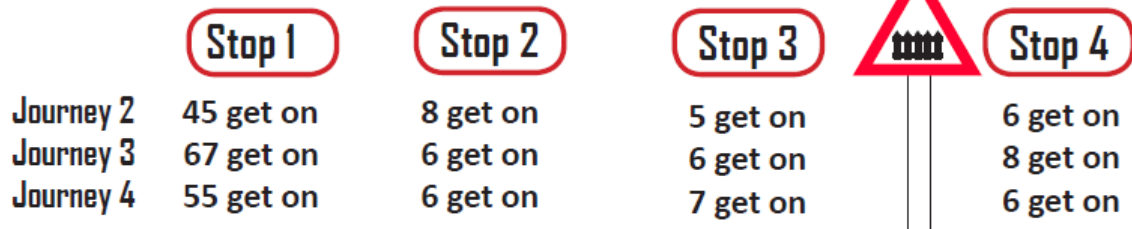
Where is that on the line?

# Train journey

## Sheet 4

At each stop, more passengers get on the train.

Add the number of passengers to each new total. Write each addition clearly on your sheet.



Challenge



# Train journey

Sheet 4 continued

Stop 1

Stop 2

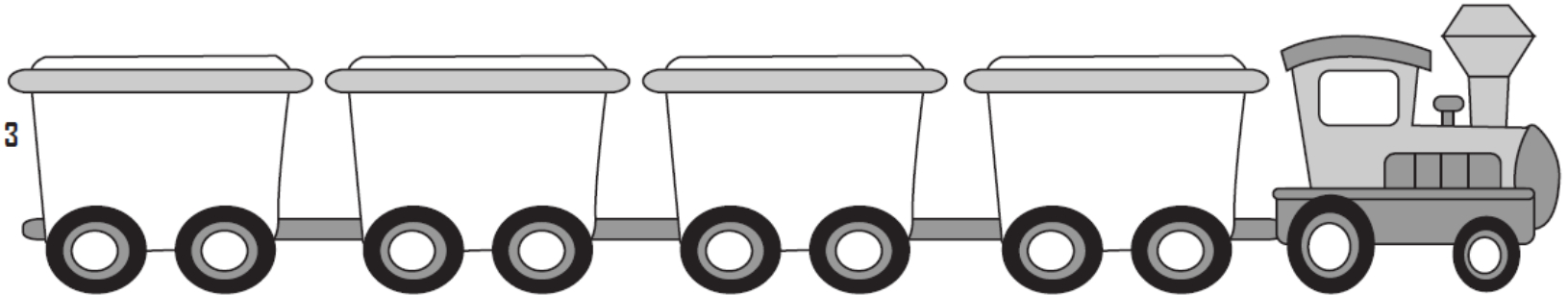
Stop 3

Stop 4

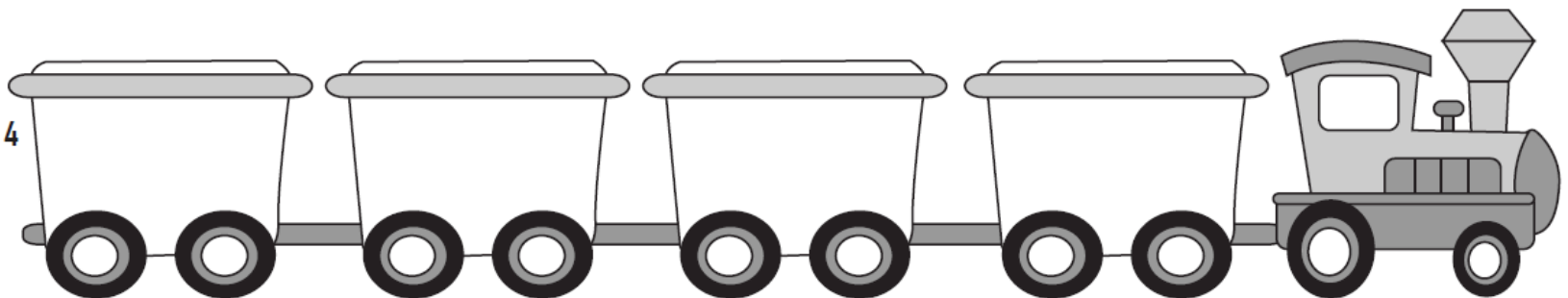
Journey 2



Journey 3



Journey 4





# Addition and Subtraction

## Mental addition and subtraction

### Objectives

Day 4

Add three numbers, using number bonds to 10.

Subtract a single-digit number from a 2-digit number, bridging 10.

Day 4: **Add three numbers, using number bonds to 10.** Subtract a single-digit number from a 2-digit number, bridging 10.



What is the **total** number of spots on these first two dice?

What is 10 add another 3?

13

Day 4: **Add three numbers, using number bonds to 10.** Subtract a single-digit number from a 2-digit number, bridging 10.



How did you  
add them?



Is there an  
efficient order to  
do it?



Day 4: **Add three numbers, using number bonds to 10.** Subtract a single-digit number from a 2-digit number, bridging 10.



5 add 5 makes  
10, then  
another 2  
makes 12.

Let's add them  
now...

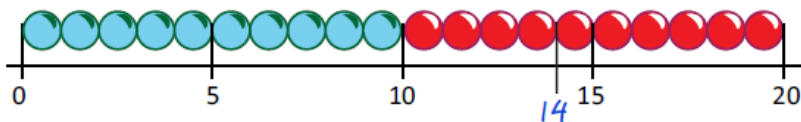
# Adding 3 numbers

## Sheet 1

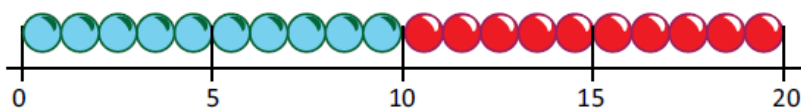
Example

*This makes 10*

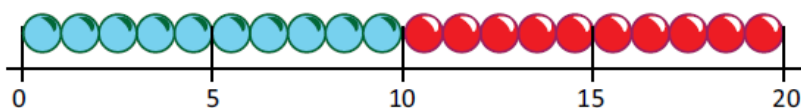
$$\boxed{9} + \boxed{4} + \boxed{1} = \boxed{14}$$



$$\boxed{5} + \boxed{2} + \boxed{8} = \boxed{\phantom{00}}$$



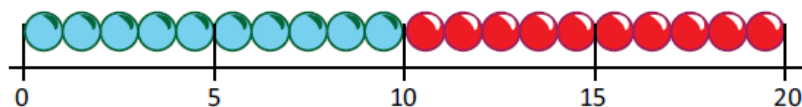
$$\boxed{7} + \boxed{3} + \boxed{4} = \boxed{\phantom{00}}$$



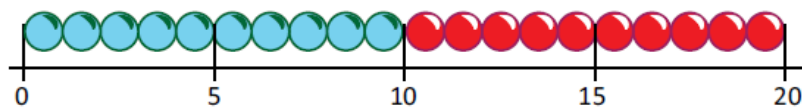
**Challenge**



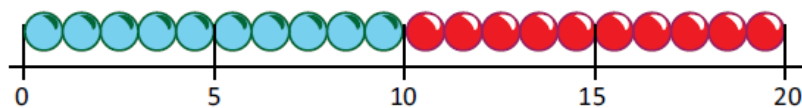
$$\boxed{4} + \boxed{5} + \boxed{6} = \boxed{\phantom{00}}$$



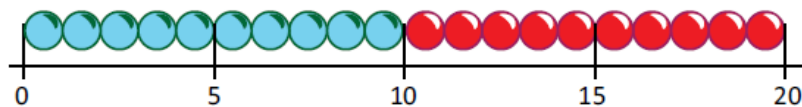
$$\boxed{3} + \boxed{7} + \boxed{8} = \boxed{\phantom{00}}$$



$$\boxed{3} + \boxed{6} + \boxed{4} = \boxed{\phantom{00}}$$



$$\boxed{5} + \boxed{9} + \boxed{5} = \boxed{\phantom{00}}$$



## Day 4: Subtract a single-digit number from a 2-digit number, bridging 10.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Remember that these are special numbers.

$$32 - 6 = 26$$

If we count back 6, we will cross a multiple of ten (30).

This is the opposite of when we were adding.

## Day 4: Subtract a single-digit number from a 2-digit number, bridging 10.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Remember that these are special numbers.

$$45 - 7 = 38$$

If we count back 7, we will cross a multiple of ten (40).

**Day 4: Subtract a single-digit number from a 2-digit number, bridging 10.**

$$27 - 5$$

$$22 - 5$$

$$33 - 4$$

Which will cross a 'red' number on the 100-grid; that is, they will 'break' into the next group of 10 beads down on a bead bar?

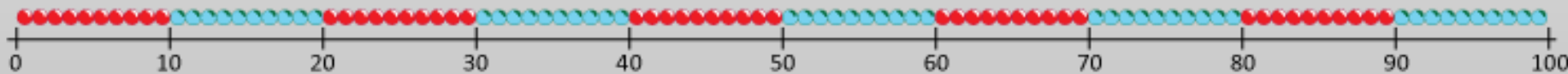
Don't cross a 10s number

$$27 - 5$$

Cross a 10s number

$$22 - 5$$

$$33 - 4$$





# Matching up

## Sheet 4

Match the questions to the correct answers.

$45 - 8$

78

67

$53 - 5$

$77 - 9$

75

38

$29 - 7$

$86 - 8$

58

22

$64 - 6$

$53 - 5$

37

$42 - 4$

$78 - 3$

68

48

48

$74 - 7$

Challenge



# Addition and Subtraction

## Mental addition and subtraction

### Objectives

Day 5

**Add three numbers, using doubles and number bonds.**

**Add three, four or five numbers, using doubles and number bonds.**

**Day 5: Add three numbers, using doubles and number bonds. Add three, four or five numbers, using doubles and number bonds.**

Shuffle 2 packs of 0-9 digit cards, then take 4, 3 and 4.

Now we need to calculate 8 add 3.

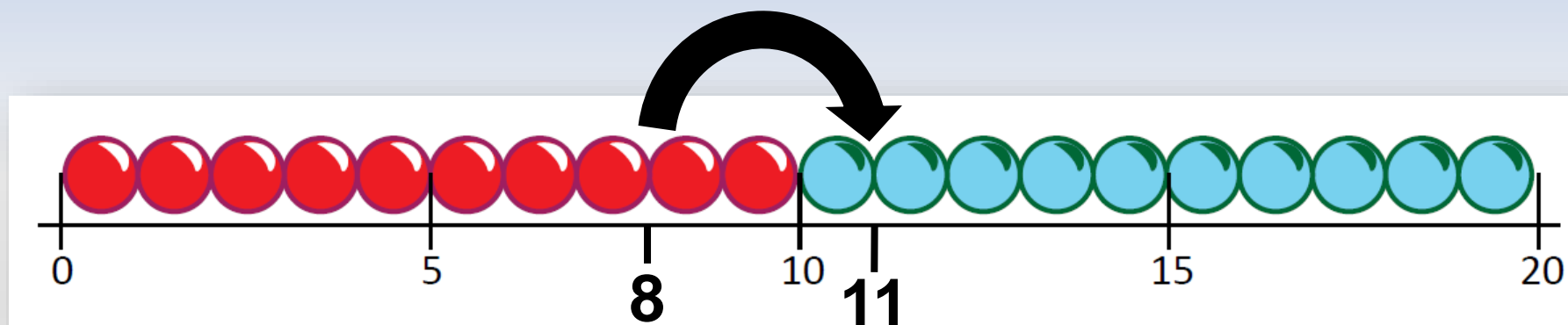
4

3

4

8

Day 5: **Add three numbers, using doubles and number bonds.** Add three, four or five numbers, using doubles and number bonds.



Where have  
we landed?

$$4 + 4 + 3 = 11$$

Day 5: **Add three numbers, using doubles and number bonds.** Add three, four or five numbers, using doubles and number bonds.

Hold 3 fingers up.  
We had 8 so now  
we count on 3...



**Day 5: Add three numbers, using doubles and number bonds. Add three, four or five numbers, using doubles and number bonds.**

Take out another set of 3 cards.

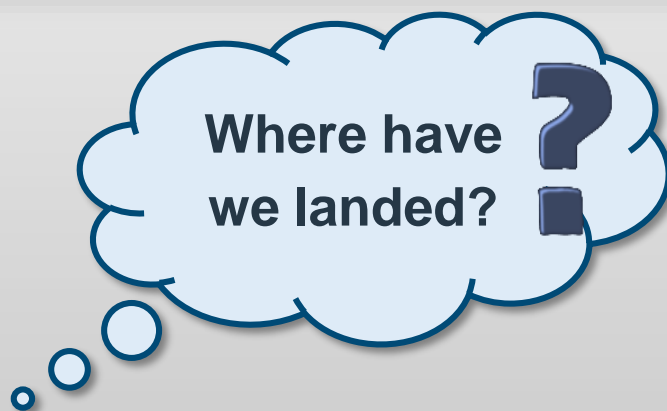
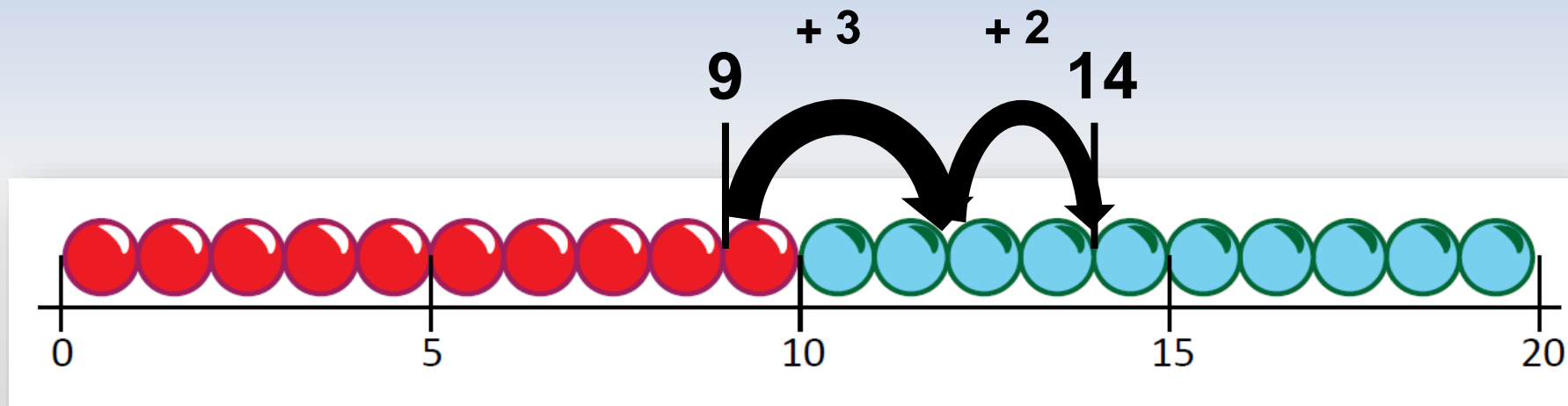
**9 is quite a big number to count on at the end, so let's put it first.**

**2**

**3**

**9**

Day 5: **Add three numbers, using doubles and number bonds.** Add three, four or five numbers, using doubles and number bonds.



$$9 + 3 + 2 = 14$$

Day 5: **Add three numbers, using doubles and number bonds.** Add three, four or five numbers, using doubles and number bonds.

$$\boxed{5} + \boxed{5} + \boxed{6} + \boxed{4} + \boxed{3} = \boxed{\phantom{00}}$$

$$\boxed{10} + \boxed{10} + \boxed{3} = \boxed{\phantom{00}}$$

Wow! That's a long number sentence! We could just  
Let's move the numbers  
around and see how see  
how it helps.

Now we can **add the  
pairs that make 10...**

$$\boxed{20} + \boxed{3} = \boxed{23}$$

our partner.  
We change  
the order to make it  
easier? Are there  
any **number facts**



...and then add the

...Finally we can add  
the 3 to the 20.



## Cross sums

*Y1: Children arrange numbers 1 to 5 on a cross and show that the row and column have the same total. Y2: Children find totals of 5 numbers less than 10 to give different totals.*

## Skill practised:

- Y1: Adding three single-digit numbers
- Y2: Adding five single-digit numbers using number facts including pairs to 10, to help

**Conjecture:** *It is possible to arrange numbers 1 to 5 in a cross such that the row and column have the same total. We can say how many ways there are to do this. Y2: It is possible to find two sets of five numbers less than 10 such that one total is 1 more than the other. Each number from 0 to 9 must only be used once.*

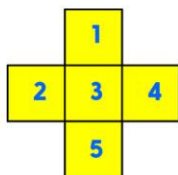
## What to do:

*Children work individually or in pairs.*

*Y1 children will need a set of 1 to 5 digit cards. Y2 children need a set of 0 to 9 digit cards.*

### Year 1

1. Arrange your five cards in a cross like this:



2. Find the total of the three numbers going down, i.e.  $1 + 3 + 5$ , and then the total of the three numbers going across, i.e.  $2 + 3 + 4$ . What do you notice?
3. Keep 3 in the middle but rearrange the other cards so that both lines on the cross still have the same total.
4. Put 1 in the middle and see if you can place the other cards so that each line has the same total. But this total will be different from before!

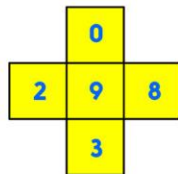
Repeat this with 2, 4 and 5 in the middle. Which middle numbers are possible and which aren't? What do you notice about the central numbers which are possible?

**CHALLENGE:** Can you say how many ways are possible in all?

Can you apply what they have learnt to arrange numbers 2, 3, 4, 5 and 6 in a cross, with each line having the same total?

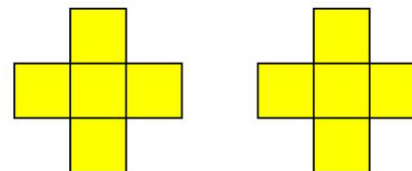
### Year 2

1. Find the total of all five numbers in this cross. Can you see a pair to 10 which will help you to find the total more easily?



# Investigation: Adult Sheet

2. Use any five digit cards from 0 to 9 to make your own cross and find the total. Think about the easiest way to add them.
3. What is the smallest total that you can find? And the biggest total?
4. Now for the real challenge! Use all the digit cards 0 to 9, once each to make two crosses so that one cross has a total which is 1 more than the other.



**HINT:** When you have made two crosses, look at their totals and think how you might swap numbers between them to make their totals closer together.

Now can you find a different way to make two crosses with one total 1 more than the other?

### Aims:

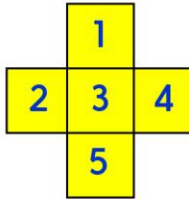
- To use trial and improvement to work towards a solution
- Y1: To understand that some central numbers give possible solutions and others don't
- Y1: To find a total number of ways and demonstrate that this is all the possible solutions

**Minimum number of calculations expected**

10

## Cross sums

1. Arrange your five cards in a cross like this:



2. Find the total of the three numbers going down and then a total of the three numbers going across. What do you notice?
3. Now keep 3 in the middle but rearrange the other cards so that both lines on the cross still have the same total.
4. Put 1 in the middle and see if you can place the other cards so that each line has the same total. This total will be different from before!

$1 + 3 + 5 = 9$
$2 + 3 + 4 =$

Repeat this with 2, 4 and 5 in the middle.  
Which middle numbers work? Which don't?

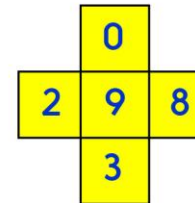
What do you notice about the central numbers which are possible?

### Challenge

Can you say how many ways are possible in all?  
Can you arrange the numbers 2, 3, 4, 5 and 6 in a cross, with each line having the same total?

## Investigation: *Child Sheet*

1. Find the total of all five numbers in this cross.  
Can you see a pair to 10 which will help you to find the total more easily?



2. Use any five digit cards from 0 to 9 to make your own cross and find the total. Think about the easiest way to add them.
3. What is the smallest total that you can find? And the biggest total?
4. Now for the real challenge! Use all the digit cards 0 to 9, once each to make two crosses so that one cross has a total which is 1 more than the other.

$0 + 2 + 9 + 8 + 3 = 22$

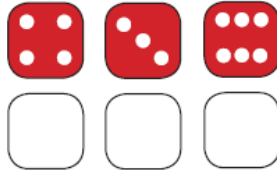
Now can you find a different way to make two crosses with one total 1 more than the other?

## Adding 3 dice

### Sheet 1

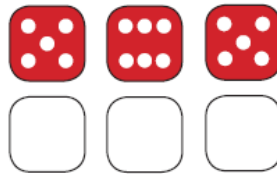
Can you re-arrange the dice into the order you might add them together?  
Remember to look for doubles and number bonds to help you.  
e.g.  $6 + 4 + 2 = 12$

1.



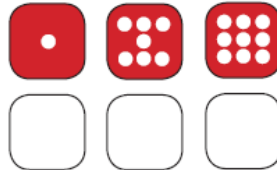
$$\square + \square + \square = \square$$

2.



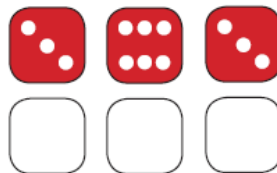
$$\square + \square + \square = \square$$

3.



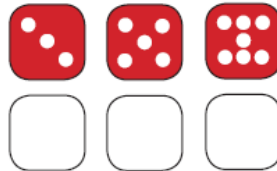
$$\square + \square + \square = \square$$

4.



$$\square + \square + \square = \square$$

5.



$$\square + \square + \square = \square$$

# Adding using number facts

## Sheet 3

Can you spot any pairs to 10 or doubles that will help you add the numbers?

Add these numbers	Pairs to 10	Doubles	Other facts	Answer
1, 9, 3	$9 + 1 = 10$			$10 + 3 = 13$
3, 7, 4				
4, 5, 4				
6, 2, 6				
2, 5, 8				
5, 4, 9, 4, 1	$9 + 1 = 10$	$4 + 4 = 8$		$10 + 8 + 5 = 23$
3, 6, 7, 6, 3				
9, 2, 4, 8, 6				
7, 5, 7, 4, 5				
9, 3, 4, 3, 5				
8, 4, 2, 4, 1				

# Addition and Subtraction

## Mental addition and subtraction



Well Done! You've completed this unit.

### Objectives

#### Day 1

**Know number bonds to 8; Recognise that addition can be done in any order.**

**Use number facts to add and subtract.**

#### Day 2

**Know number bonds to 9; Recognise that addition can be done in any order.**

**Use number facts and place value to add and subtract.**

#### Day 3

**Relate addition and subtraction number facts.**

**Add a single-digit number to a 2-digit number, bridging 10.**

#### Day 4

**Add three numbers, using number bonds to 10.**

**Subtract a single-digit number from a 2-digit number, bridging 10.**

#### Day 5

**Add three numbers, using doubles and number bonds.**

**Add three, four or five numbers, using doubles and number bonds.**

# Problem solving and reasoning questions

## Year 1

Point at the first number and count on.

$5 + \square = 9 \quad 6 + \square = 8$

$\square + 6 = 9 \quad 3 + \square = 8$

$\square + 2 = 9 \quad 1 + \square = 8$

9 frogs in the pond. 3 hop out. How many now?

8 beetles on a leaf. 5 fly away. How many now?

Choose 3 numbers:

[7] [3] [5] [4] [7] [6]

Choose an efficient strategy to add them. Write the answer.

Tell me why you added them in that order.

Choose three more and do it again...

# Problem solving and reasoning questions

## Year 2

Fact families. Write 4 number sentences that link each 'trio' of numbers:

3, 8, 5   27, 2, 25

Fill in the missing numbers:

$$62 + \square = 69 \quad 48 = 43 + \square$$

$$37 + \square = 41 \quad \square - 5 = 74$$

Solve each addition using a different method. Say how you did each one.

$$30 + 9 =$$

$$17 + 5 =$$

$$4 + 7 + 6 =$$

Solve each subtraction using a different method. Say how you did each one.

$$25 - 5 =$$

$$14 - 6 =$$

$$58 - 4 =$$

# Problem solving and reasoning answers

## Year 1

Point at the first number and count on.

$$5 + 4 = 9 \quad 6 + 2 = 8$$

$$3 + 6 = 9 \quad 3 + 5 = 8$$

$$7 + 2 = 9 \quad 1 + 7 = 8 \quad \text{If children are consistently wrong, check that they are not including the start number in the count.}$$

9 frogs in the pond. 3 hop out. How many now? **6** This, and the following question, can be modelled with counters or cubes.

8 beetles on a leaf. 5 fly away. How many now? **3**

Choose 3 numbers:

[7] [3] [5] [4] [7] [6]

Choose an efficient strategy to add them. Write the answer.

Tell me why you added them in that order.

Strategies to look for include....

- ♦ Number bonds to 10 ( $7 + 3$  /  $6 + 4$ )
- ♦ Using place value to add on from 10, e.g.  $10 + 5 = 15$ .
- ♦ Using a double ( $7 + 7$ ) or near double ( $5 + 6$ )
- ♦ Counting on from a larger number, e.g.  $5 + 3$  rather than  $3 + 5$ .



# Problem solving and reasoning **answers**

## Year 2

Fact families. Write 4 number sentences that link each 'trio' of numbers:

3, 8, 5       $3 + 5 = 8$ ,  $5 + 3 = 8$ ,  $8 - 5 = 3$ ,  $8 - 3 = 5$

27, 2, 25       $25 + 2 = 27$ ,  $2 + 25 = 27$ ,  $27 - 2 = 25$ ,  $27 - 5 = 2$

Fill in the missing numbers:

$62 + 7 = 69$      $48 = 43 + 5$

$37 + 4 = 41$      $79 - 5 = 74$     Where children's answers in these and the questions below are 1 more or 1 less than the actual answer this is most likely due to counting on in 1s, rather than using number facts.

Solve each addition using a different method. Say how you did each one.

$30 + 9 = 39$       Place value addition.

$17 + 5 = 22$       Splitting 5 into 3 and 2, use 20 as a bridge.

$4 + 7 + 6 = 17$       Recognise number bond to 10; add 7 using PV.

Solve each subtraction using a different method. Say how you did each one.

$25 - 5 = 20$       Place value subtraction.

$14 - 6 = 8$       Split 6 into 4 and 2; use 10 as a bridge to subtract 4, then 2.

$58 - 4 = 54$       Use the number fact  $8 - 4 = 4$ .