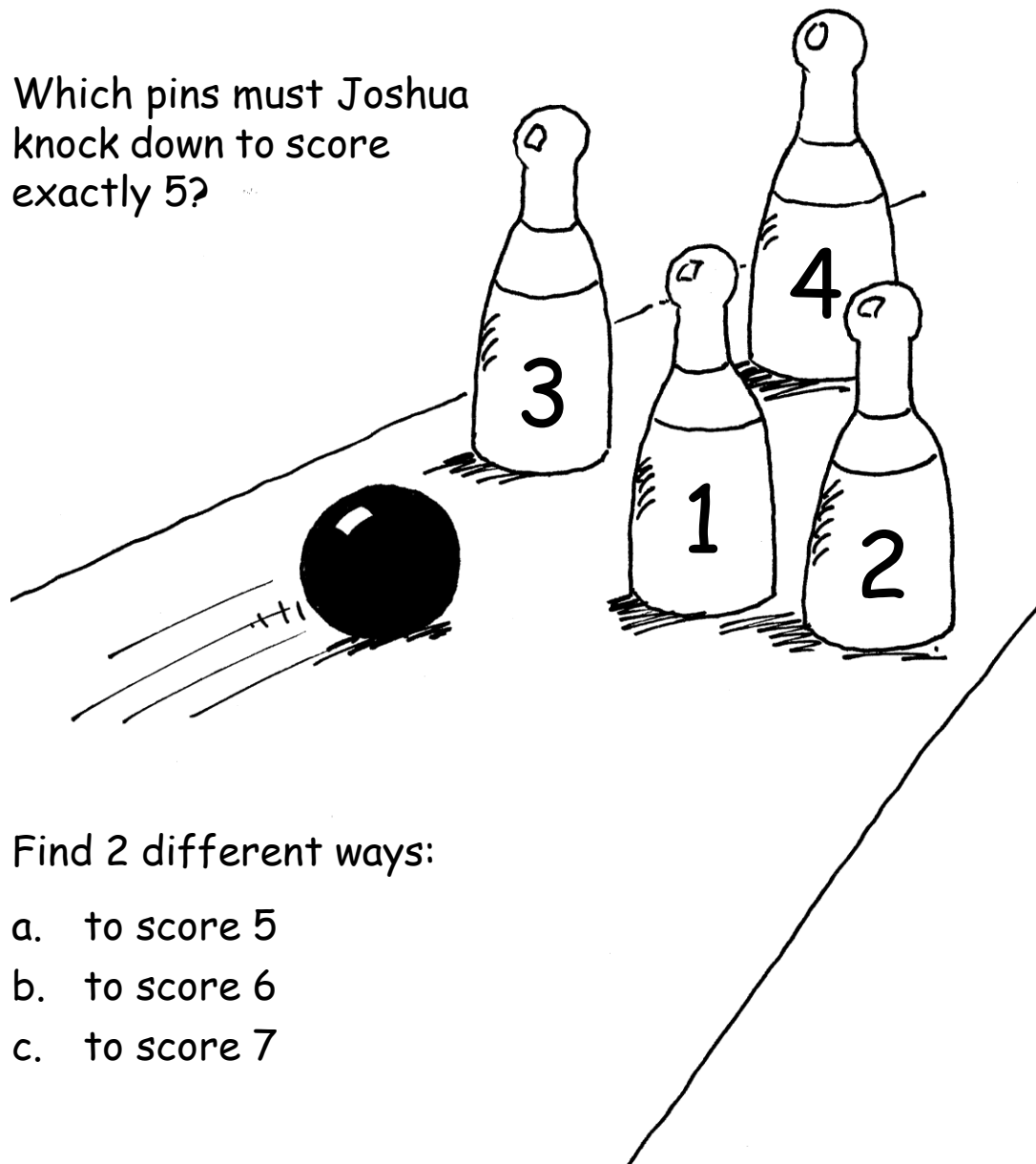


BRONZE CHALLENGE

Four-pin bowling

Which pins must Joshua knock down to score exactly 5?



Find 2 different ways:

- a. to score 5
- b. to score 6
- c. to score 7

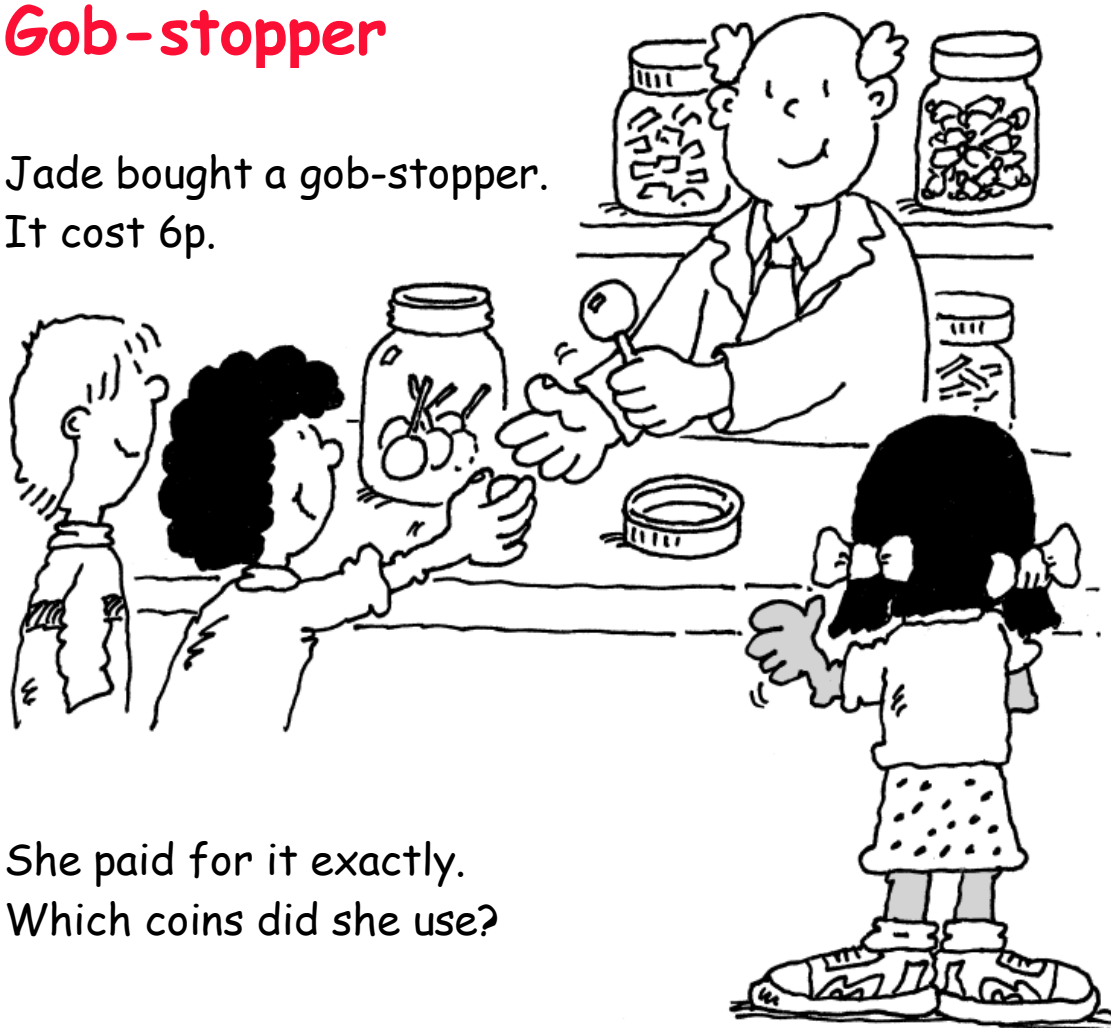
1

Teaching objectives

Solve mathematical problems or puzzles.
Know addition and subtraction facts up to 10.

Gob-stopper

Jade bought a gob-stopper.
It cost 6p.



She paid for it exactly.
Which coins did she use?

There are 5 different ways to do it.
Find as many as you can.

What if the gob-stopper cost 7p?

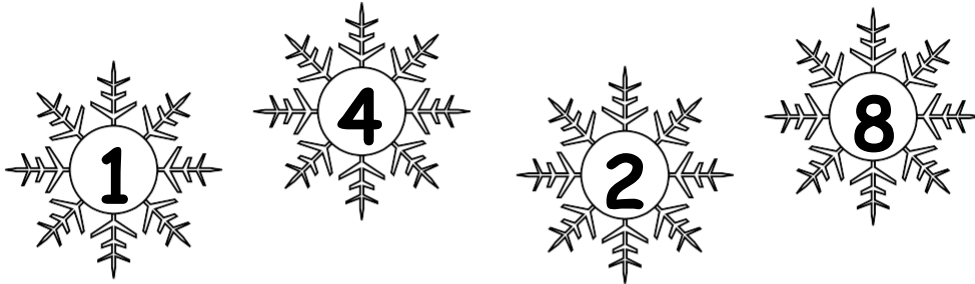
Teaching objectives

Solve mathematical problems or puzzles.
Know addition and subtraction facts up to 10.
Find totals, give change, and work out which coins to pay.

2

Pick a pair

Choose from these numbers.



1. Pick a pair of numbers.
Add them together.
Write the numbers and the answer.

Pick a different pair of numbers.
Write the numbers and the answer.

Keep doing it.
How many different answers can you get?

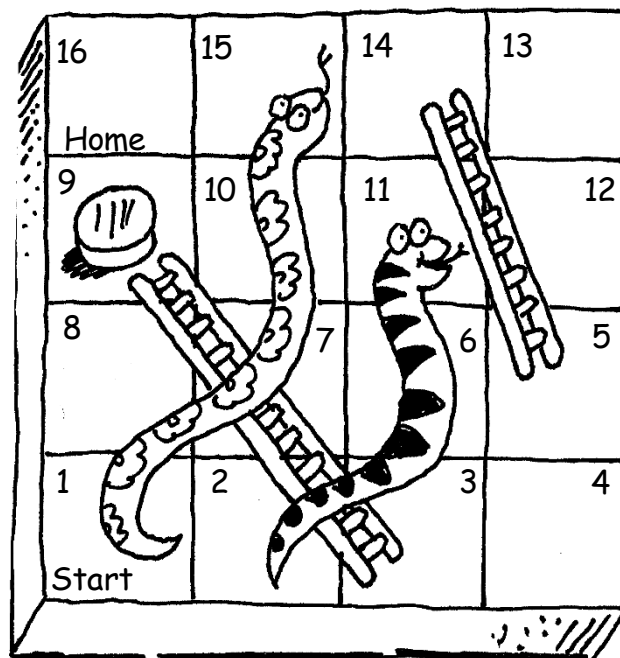
2. Now take one number from the other.
How many different answers can you get now?

3

Teaching objectives

Solve mathematical problems or puzzles.
Know addition and subtraction facts up to 10.

Snakes and ladders



Your counter is on 9.

You roll a 1 to 6 dice.

After two moves you land on 16.

Find all the different ways you can do it.

Now think of other questions you could ask.

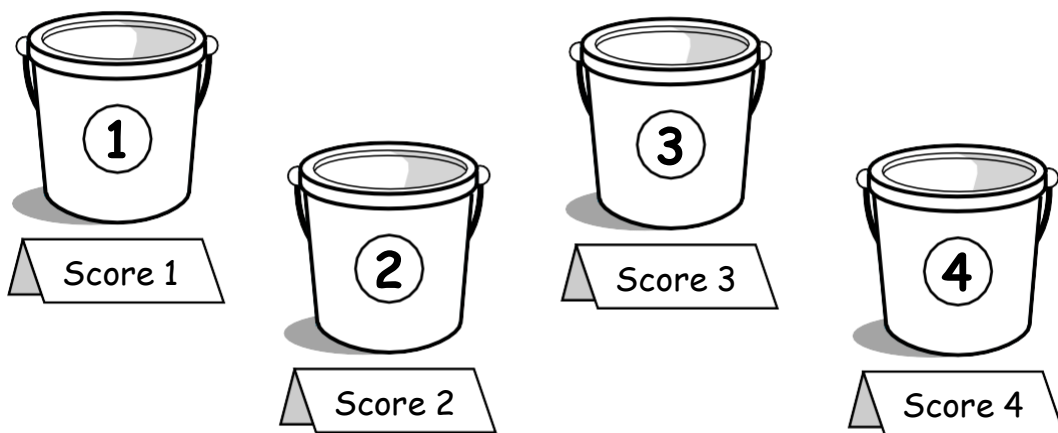
Teaching objectives

Solve mathematical problems or puzzles.
Count on from any small number.

4

Bean-bag buckets

Dan threw 3 bean-bags.
Each bag went in a bucket.
More than one bag can go in a bucket.



1. What is the highest score Dan can get?
2. Find three ways to score 6.
3. Find three ways to score 9.
4. What other scores can Dan get?

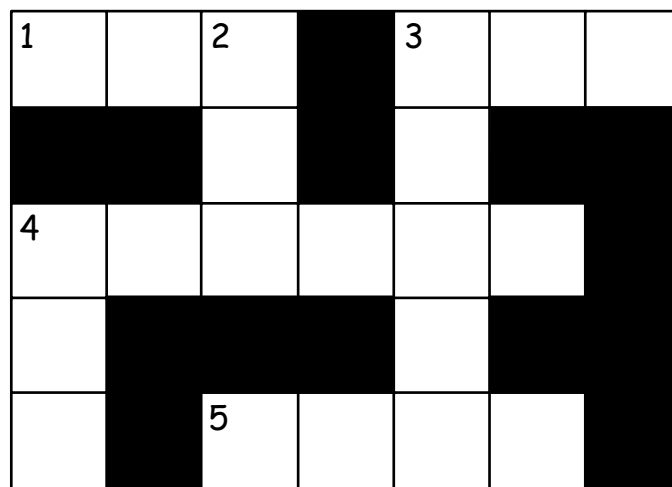
5

Teaching objectives

Solve mathematical problems or puzzles.
Know addition facts up to 10.

Crossword

Write the answers to this puzzle in words:
ONE, TWO, THREE, ...



Across

1. $7 - 5$

3. $2 + 5 - 1$

4. $4 + 4 + 4$

5. $13 - 4$

Down

2. $3 + 4 - 6$

3. $9 - 2$

4. $11 - 4 + 3$

Teaching objectives

Solve mathematical problems or puzzles.

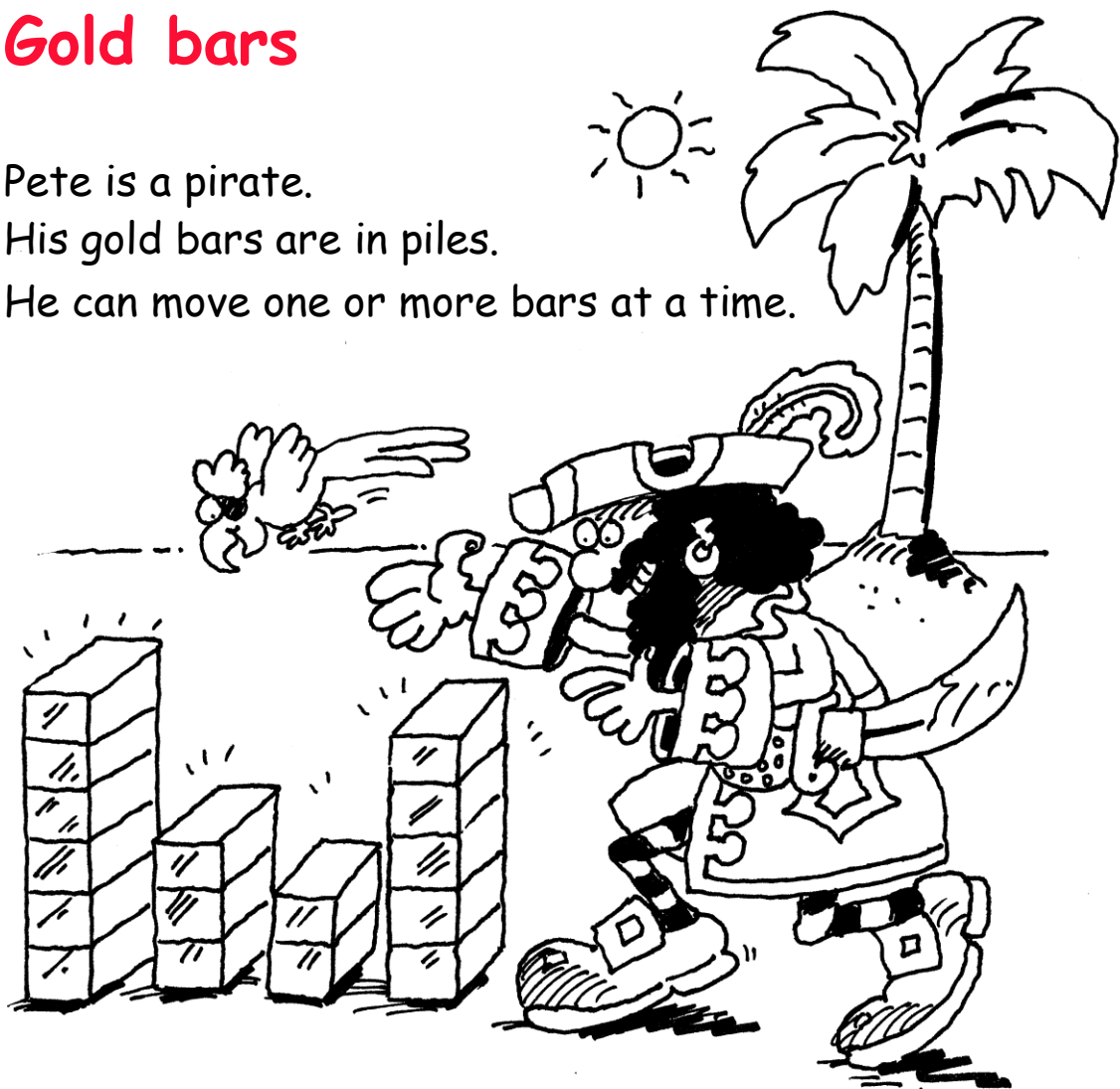
Use known number facts and place value to add and subtract mentally.

Read and write whole numbers.

6

Gold bars

Pete is a pirate.
His gold bars are in piles.
He can move one or more bars at a time.



He made all the piles the same height.
He made just two moves.
How did he do it?

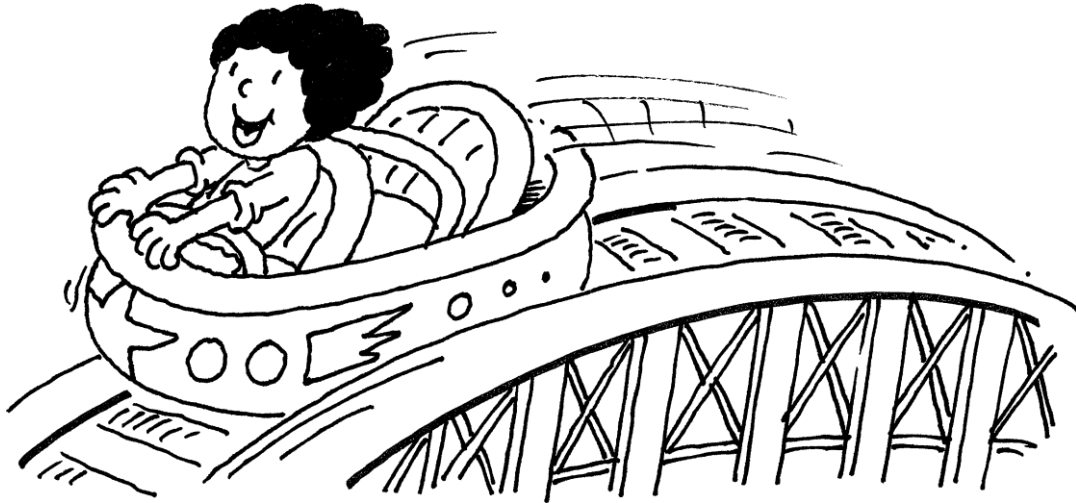


7

Teaching objectives

Solve mathematical problems or puzzles.
Explain methods and reasoning.

Ride at the fair



Lucy had a ride at the fair.
Her Mum asked Lucy to pay less than 20p towards it.

Lucy paid exactly three coins towards the ride.
How much did Lucy pay her Mum?

Find different ways to do it.



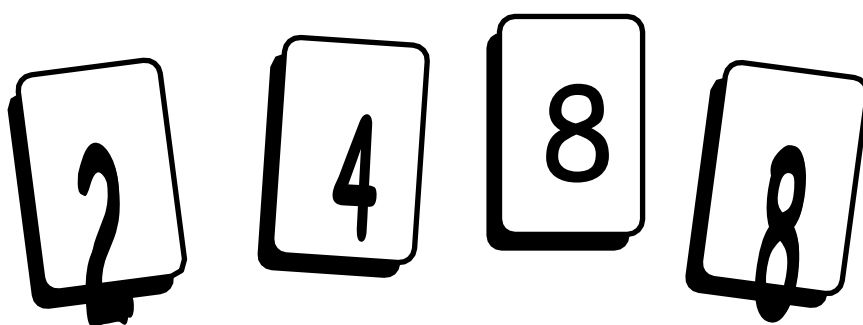
Teaching objectives

Solve mathematical problems or puzzles.
Find totals, give change, and work out which coins to pay.

8

Sum up

Choose from these four cards.



Make these totals:

4

- 9
- 10
- 11
- 12
- 13
- 14
- 15

What other totals can you make from the cards?

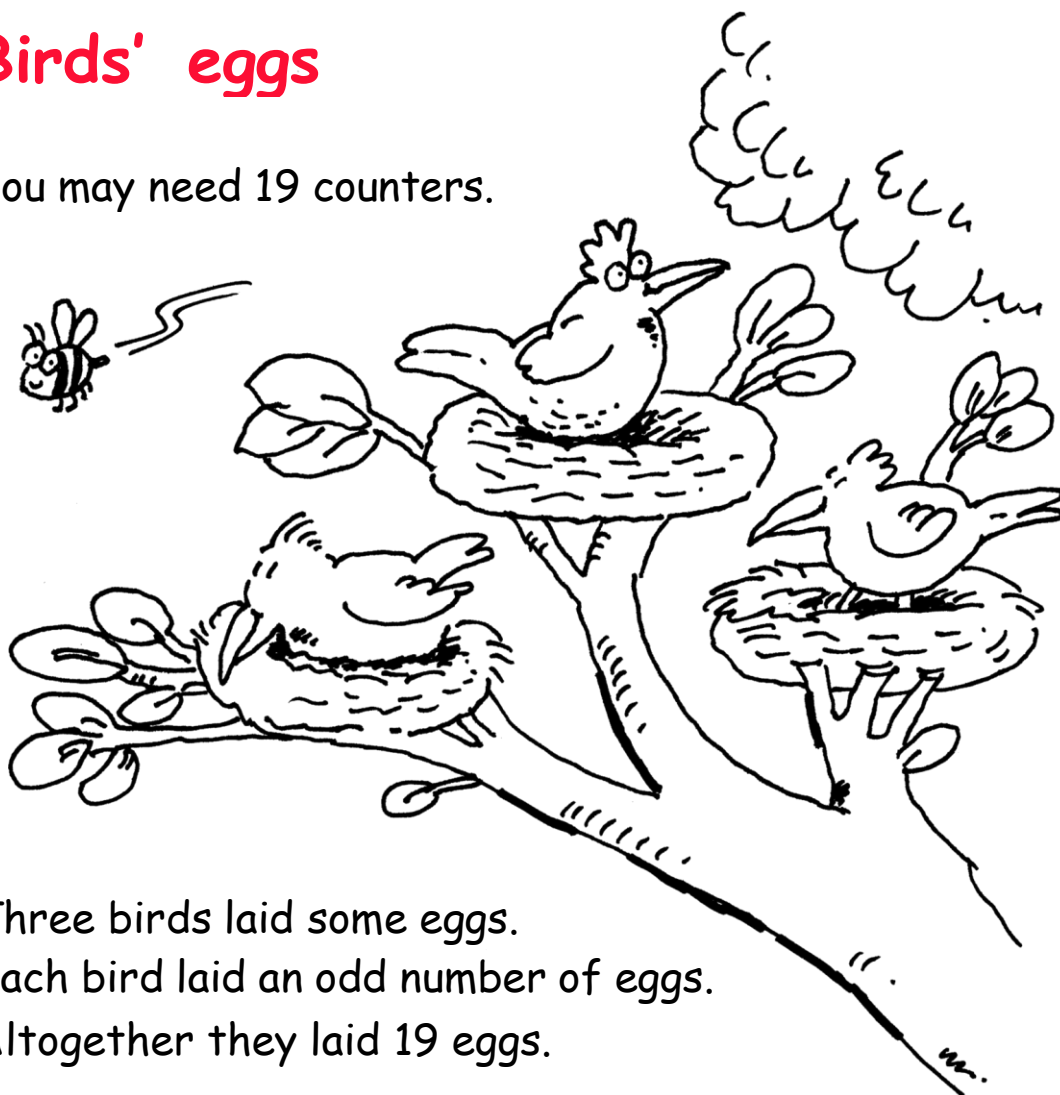
9

Teaching objectives

Solve mathematical problems or puzzles.
Know addition and subtraction facts to at least 10.
Add three small numbers mentally.

Birds' eggs

You may need 19 counters.



Three birds laid some eggs.
Each bird laid an odd number of eggs.
Altogether they laid 19 eggs.

How many eggs did each bird lay?
Find different ways to do it.

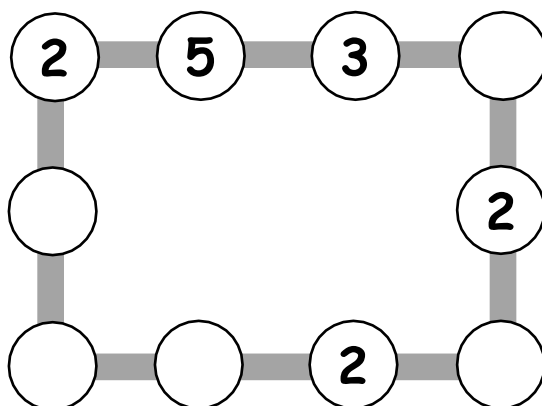
Teaching objectives

Solve mathematical problems or puzzles.
Recognise odd and even numbers.
Add three small numbers mentally.

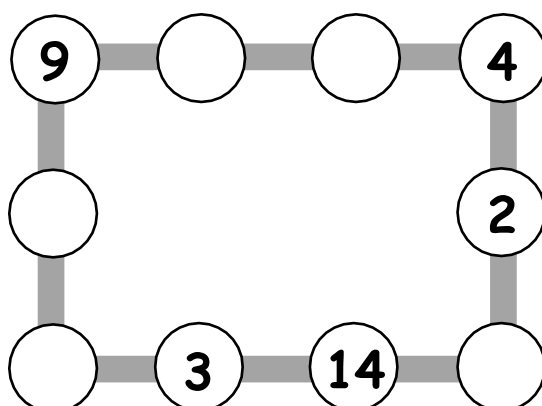
10

Number lines

1. Make each line add up to 16.



2. Make each line add up to 20.



3. Make up your own puzzle like this.
Ask a friend to do it.

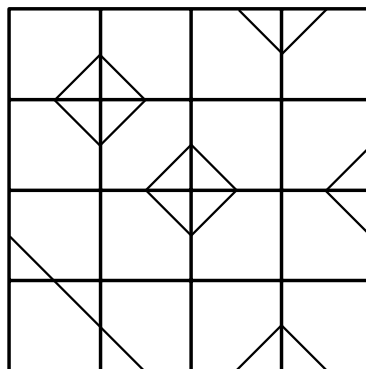
11

Teaching objectives

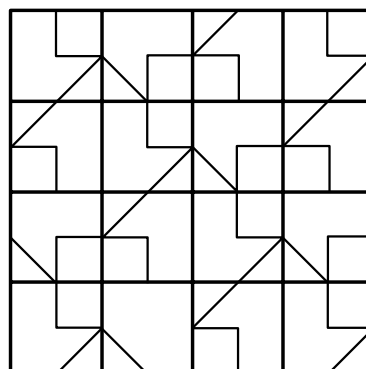
Solve mathematical problems or puzzles.
Know addition and subtraction facts up to 20.
Add three small numbers mentally.

Odd one out

- Here is a grid of 16 squares.
One square is different from all the others.
Mark it on the grid.



- Now do this one.



Teaching objectives

Solve mathematical problems or puzzles.
Make and describe patterns and pictures.

12

Line of symmetry

You need:
some squared paper,
a red pen, a green pen and a blue pen.

Gopal had six squares: two red, two green, two blue.
He put them in a line.

The squares made a symmetrical pattern.

red	blue	green	green	blue	red
-----	------	-------	-------	------	-----

Arrange six squares in a line.

Make two squares red, two green and two blue.

Make the line of squares symmetrical.

How many different lines can you make like this?

13

Teaching objectives

Solve mathematical problems or puzzles.

Begin to recognise line symmetry.

Solve a problem by sorting, classifying and organising information.

Card sharp

Take ten cards numbered 0 to 9.



1. Pick three cards with a total of 12.
You can do it in 10 different ways.
See if you can record them all.
2. Now pick four cards with a total of 12.
How many different ways can you do it?
3. Can you pick five cards with a total of 12?

Teaching objectives

Solve mathematical problems or puzzles.

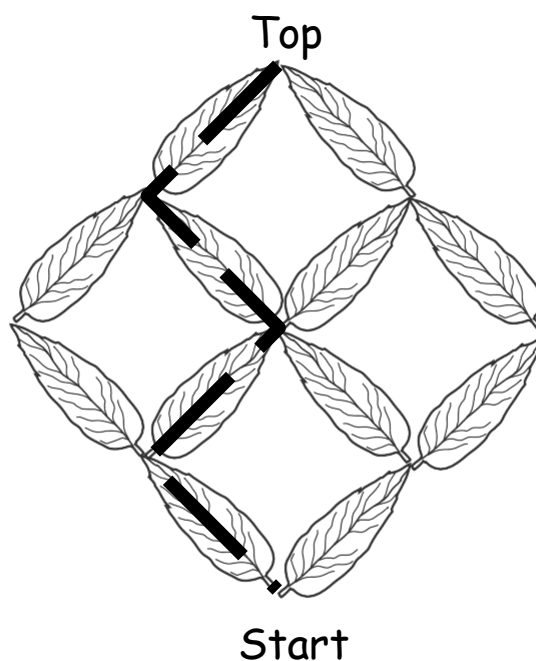
Know addition facts to at least 10.

Solve a problem by sorting, classifying and organising information.

14

Jack and the beanstalk

Jack climbed the beanstalk.
He always went upwards.



He first did it like this: left, right, left, right.

Find five other ways that Jack can climb the beanstalk.

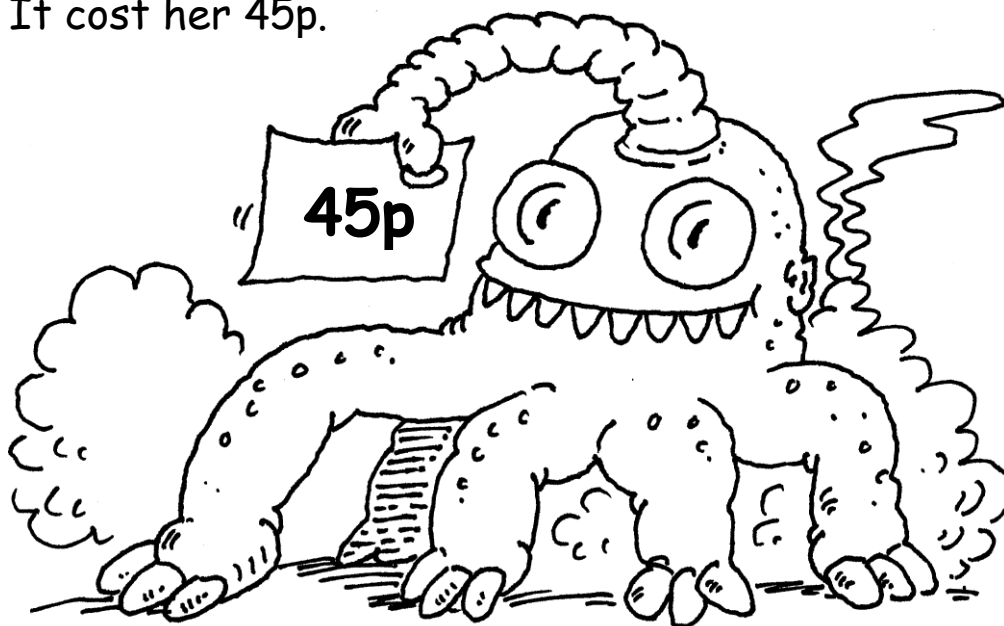
15

Teaching objectives

Solve mathematical problems or puzzles.
Recognise turns to the left or to the right.
Give instructions for moving along a route.

Monster

Alesha bought a monster using only silver coins.
It cost her 45p.



There are nine different ways to pay 45p exactly
using only silver coins.
Find as many as you can.

What if the monster cost 50p?
How many different ways are there to pay now?

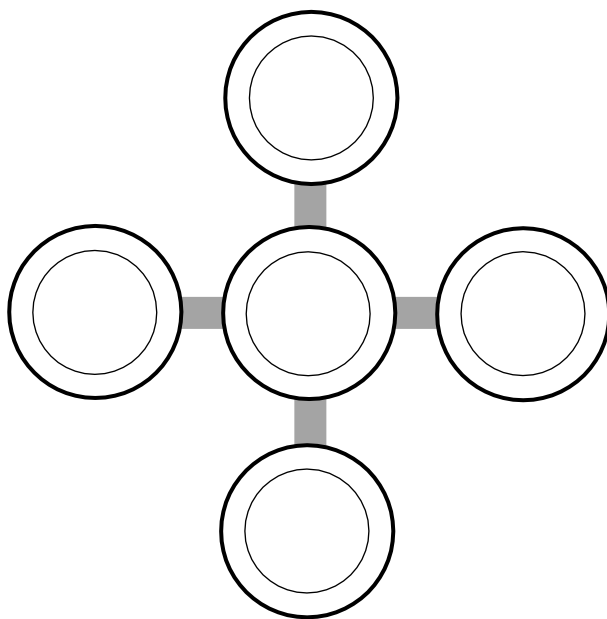
Teaching objectives

Solve mathematical problems or puzzles.
Find totals.
Work out which coins to pay.

16

Cross-road

You need 5 paper plates and 15 counters.
Put the plates in a cross.



Use all 15 counters.
Put a different number on each plate.
Make each line add up to 10.

Do it again.
This time make each line add up to 8.

17

Teaching objectives

Solve mathematical problems or puzzles.
Know addition and subtraction facts up to 10.
Add three small numbers mentally.

Fireworks

Emma had some fireworks.
Some made 3 stars.
Some made 4 stars.



Altogether Emma's fireworks made 19 stars.
How many of them made 3 stars?
Find two different answers.

What if Emma's fireworks made 25 stars?
Find two different answers.



Teaching objectives

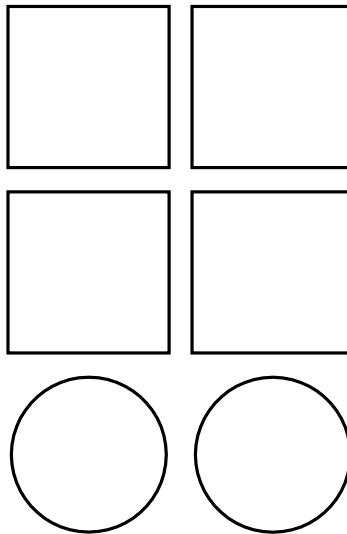
Solve mathematical problems or puzzles.

Count on in steps of 3 or 4 from zero, or from any small number.

18

Coloured shapes

What colour is each shape?
Write it on the shape.



Clues

- ◆ Red is not next to grey.
- ◆ Blue is between white and grey.
- ◆ Green is not a square.
- ◆ Blue is on the right of pink.

19

Teaching objectives

Solve mathematical problems or puzzles.
Explain methods and reasoning.

Teaching objectives

Solve mathematical problems or puzzles.
Use known number facts to add mentally.
Carry out simple multiplication.

20

Ones and twos

Holly has six numbers, three 1s and three 2s.
She also has lots of + signs, x signs and = signs.

1 2 1 2 1 2

She is trying to make the biggest number possible.
Here are some she tried.

First try

$$1 \times 2 = 2$$

$$1 \times 2 = 2$$

$$1 \times 2 = 2$$

$$2 + 2 + 2 = 6$$

Second try

$$1 + 2 + 1 + 2 + 1 + 2 = 9$$

Can you beat Holly's score?

What if Holly had three 2s and three 3s?

1 Four-pin bowling

Score 5 by knocking down 1 and 4, or 2 and 3.

Score 6 by knocking down 2 and 4, or 1, 2 and 3.

Score 7 by knocking down 3 and 4, or 1, 2 and 4.

2 Gob-stopper

Five different ways to pay 6p:

$5p + 1p$
 $2p + 2p + 2p$
 $2p + 2p + 1p + 1p$
 $2p + 1p + 1p + 1p + 1p$
 $1p + 1p + 1p + 1p + 1p + 1p$

Six different ways to pay 7p:

$5p + 2p$
 $5p + 1p + 1p$
 $2p + 2p + 2p + 1p$
 $2p + 2p + 1p + 1p + 1p$
 $2p + 1p + 1p + 1p + 1p + 1p$
 $1p + 1p + 1p + 1p + 1p + 1p + 1p$

3 Pick a pair

There are six different sums and six different (positive) differences.

- | | |
|----------------|----------------|
| 1. $1 + 2 = 3$ | 2. $2 - 1 = 1$ |
| $1 + 4 = 5$ | $4 - 2 = 2$ |
| $2 + 4 = 6$ | $4 - 1 = 3$ |
| $1 + 8 = 9$ | $8 - 4 = 4$ |
| $2 + 8 = 10$ | $8 - 2 = 6$ |
| $4 + 8 = 12$ | $8 - 1 = 7$ |

Adapt the puzzle by using larger numbers.

4 Snakes and ladders

Watching out for snakes, there are four different ways to get to 16 in two throws:

1 then 6; 3 then 4; 4 then 3; 5 then 2.

5 Bean-bag buckets

- The highest score is 12 (3 bags in 4).
- Score 6 in three ways:
1 bag in 4 and 2 bags in 1, or
1 bag in 1, 1 bag in 2 and 1 bag in 3, or
3 bags in 2.
- Score 9 in three ways:
1 bag in 1 and 2 bags in 4, or
1 bag in 2, 1 bag in 3, 1 bag in 4, or
3 bags in 3.
- Besides 6, 9 and 12, other possible scores are:
3: 3 bags in 1
4: 2 bags in 1, 1 bag in 2
5: 2 bags in 1, 1 bag in 3, or
1 bag in 1, 2 bags in 2
7: 1 bag in 1, 2 bags in 3, or
2 bags in 2, 1 bag in 3, or
1 bag in 1, 1 bag in 2, 1 bag in 4
8: 2 bags in 2, 1 bag in 4, or
1 bag in 2, 2 bags in 3, or
1 bag in 1, 1 bag in 3, 1 bag in 4
10: 1 bag in 2, 2 bags in 4

Adapt this puzzle by using larger numbers.

6 Crossword

¹ T	W	² O		³ S	I	X
		N		E		
⁴ T	W	E	L	V	E	
E				E		
N		⁵ N	I	N	E	

7 Gold bars

Move two bars from pile 1 to pile 3.
Move one bar from pile 4 to pile 2.

8 Ride at the fair

The amounts up to 20p that **cannot** be made from exactly three coins are:

1p, 2p, 10p, 18p, 19p.

Lucy could have given her Mum:

$$3p = 1p + 1p + 1p$$

$$4p = 2p + 1p + 1p$$

$$5p = 2p + 2p + 1p$$

$$6p = 2p + 2p + 2p$$

$$7p = 5p + 1p + 1p$$

$$8p = 5p + 2p + 1p$$

$$9p = 5p + 2p + 2p$$

$$11p = 5p + 5p + 1p$$

$$12p = 5p + 5p + 2p$$

$$13p = 10p + 2p + 1p$$

$$14p = 10p + 2p + 2p$$

$$15p = 5p + 5p + 5p$$

$$16p = 10p + 5p + 1p$$

$$17p = 10p + 5p + 2p$$

9 Sum up

If each number can be used only once:

$$9 = 2 + 3 + 4$$

$$10 = 2 + 8$$

$$11 = 3 + 8$$

$$12 = 4 + 8$$

$$13 = 2 + 3 + 8$$

$$14 = 2 + 4 + 8$$

$$15 = 3 + 4 + 8$$

Other solutions are possible if numbers can be repeated.

Other totals:

$$5 = 2 + 3$$

$$6 = 2 + 4$$

$$7 = 3 + 4$$

$$17 = 2 + 3 + 4 + 8$$

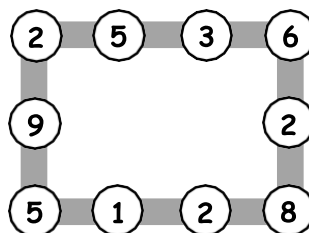
10 Birds' eggs

There are 10 possibilities:

1, 1, 17	1, 7, 11	3, 3, 13	5, 5, 9
1, 3, 15	1, 9, 9	3, 5, 11	5, 7, 7
1, 5, 13		3, 7, 9	

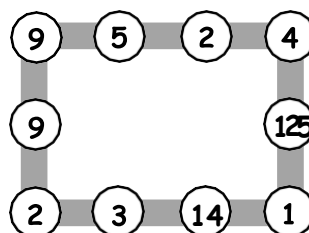
11 Number lines

1. For example:



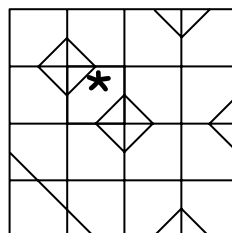
Other solutions are possible.

2. For example:

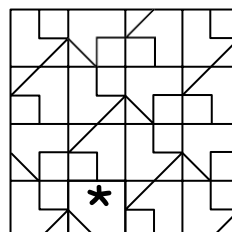


12 Odd one out

1.



2.



13 Line of symmetry

There are five other ways for Gopal to arrange the squares:

red, green, blue, blue, green, red
 green, red, blue, blue, red, green
 green, blue, red, red, blue, green
 blue, red, green, green, red, blue
 blue, green, red, red, green, blue

What if Gopal has eight squares: two red, two blue, two green and two yellow?
 How many different symmetrical lines can he make now? (24)

14 Card sharp

- There are 10 different ways to choose three cards with a total of 12:
 0, 3, 9 1, 2, 9 2, 3, 7 3, 4, 5
 0, 4, 8 1, 3, 8 2, 4, 6
 0, 5, 7 1, 4, 7
 1, 5, 6
- There are 9 different ways to choose four cards with a total of 12:
 0, 1, 2, 9 0, 2, 3, 7 1, 2, 3, 6
 0, 1, 3, 8 0, 2, 4, 6 1, 2, 4, 5
 0, 1, 4, 7 0, 3, 4, 5
 0, 1, 5, 6
- No.

Adapt the puzzle by changing the total.

15 Jack and the beanstalk

Jack can climb the beanstalk like this:

left, left, right, right
 left, right, left, right (as shown)
 left, right, right, left
 right, left, right, left
 right, left, left, right
 right, right, left, left

16 Monster

Alesha can use these coins to pay 45p:

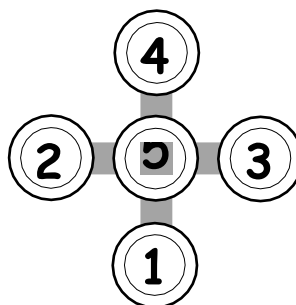
two 20p and one 5p
 one 20p, two 10p and one 5p
 one 20p, one 10p and three 5p
 one 20p and five 5p
 four 10p and one 5p
 three 10p and three 5p
 two 10p and five 5p
 one 10p and seven 5p
 nine 5p

There are 13 different ways to pay 50p using only silver coins. First add 5p to each of the ways for 45p. The other four possibilities are:

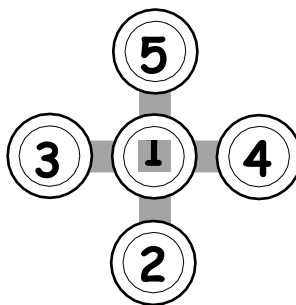
two 20p and one 10p
 one 20p and two 10p
 five 10p
 one 50p

17 Cross-road

Each line adds up to 10.



Each line adds up to 8.



18 Fireworks

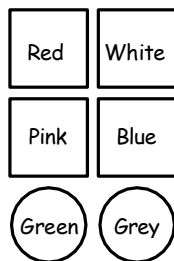
For 19 stars:

5 fireworks made 3 stars and
1 made 4 stars, or
1 firework made 3 stars and
4 made 4 stars

For 25 stars:

3 fireworks made 3 stars and
4 fireworks made 4 stars, or
7 fireworks made 3 stars and
1 firework made 4 stars

19 Coloured shapes



20 Ones and twos

Some higher scores:

$$\begin{array}{ll} 2 \times 2 \times 2 = 8 & 2 + 1 = 3 \\ 1 + 1 + 1 = 3 & 2 + 1 = 3 \\ 8 \times 3 = 24 & 2 + 1 = 3 \\ & 3 \times 3 \times 3 = 27 \end{array}$$