

Mathematical challenges for able pupils

Year 2 D Calculating, measuring
and understanding shape



Lollipop simple version with coins



Jade bought a lollipop. It cost 6p.

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

Learning Objective:

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

Solution for Lollipop Problem

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:

$$5p + 2p$$

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

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

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

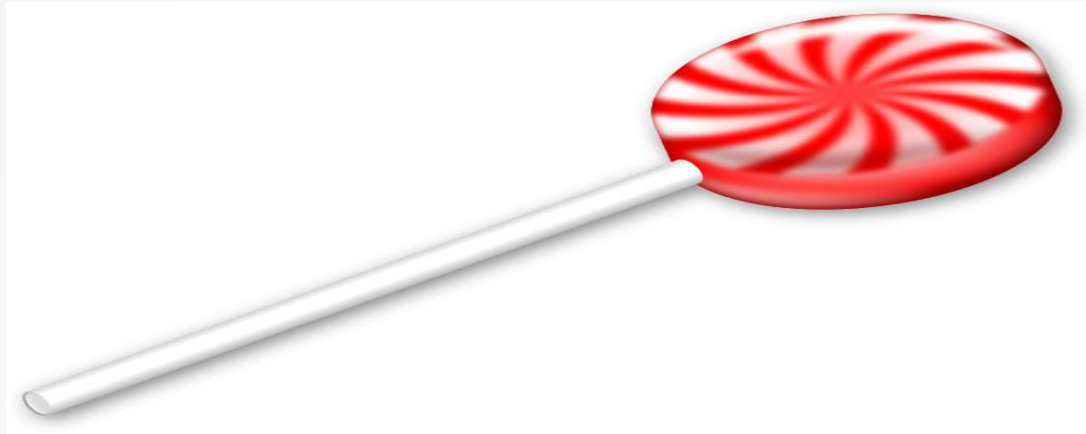
$$2p + 1p + 1p + 1p + 1p + 1p$$

$$1p + 1p + 1p + 1p + 1p + 1p + 1p$$

Learning Objective:

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

Lollipop harder version without coins



Jade bought a lollipop. It cost 6p.

What if the lollipop cost 7p?
There are 5 different ways to do it.
Find as many as you can.

Learning Objective:

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

Solution for Lollipop Problem

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:

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

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

$$1p + 1p + 1p + 1p + 1p + 1p + 1p$$

Learning Objective:

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- Know addition and subtraction facts up to 10.
- Find totals, give change, and work out which coins to pay.

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.

Learning Objective:

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

Solution to 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:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Learning Objective:

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

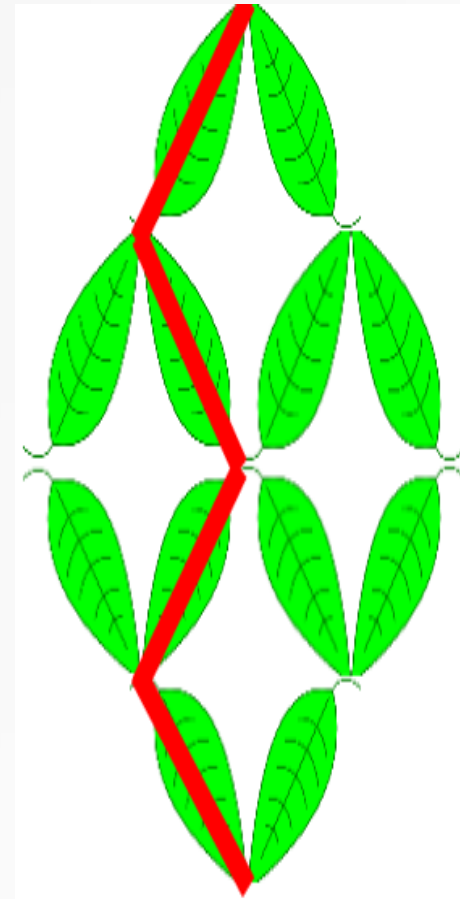
Jack and the beanstalk

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.



Learning Objective:

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

Solution to 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

Learning Objective:

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

Monster - with coins

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



What if the monster cost 50p?
There are nine different ways to pay 45p
How many different ways are there to pay
exactly using only silver coins?
Find as many as you can.

Learning Objective:

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

Solution to 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

Monster - without coins

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



What if the monster cost 50p?
There are nine different ways to pay 45p
How many different ways are there to pay
exactly using only silver coins?
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Learning Objective:

- Solve mathematical problems or puzzles.
- Find totals.
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Solution to 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

Crossword

Write the answers to this puzzle in words:

ONE, TWO, THREE.. (UP TO TWELVE)

Across →

1. $7 - 5$

3. $2 + 5 - 1$

4. $4 + 4 + 4$

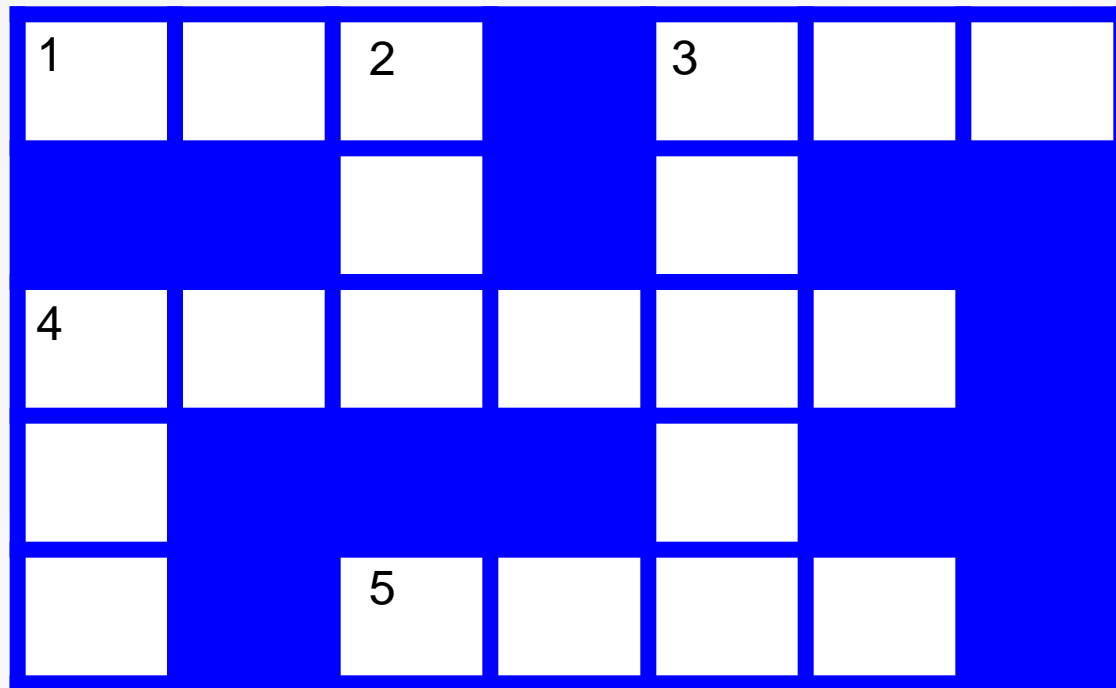
5. $13 - 4$

Down ↓

2. $3 + 4 - 6$

3. $9 - 2$

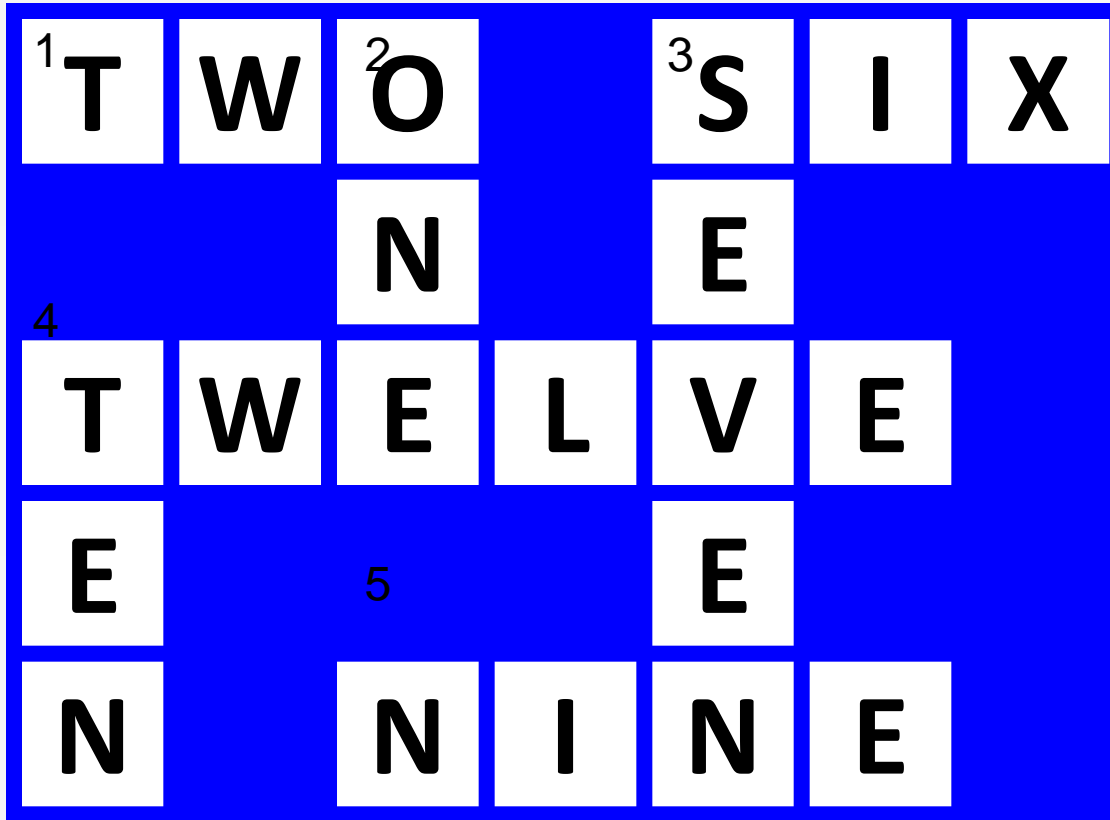
4. $11 - 4 + 3$



Learning Objective:

- Solve mathematical problems or puzzles.
- Use known number facts and place value to add and subtract mentally.
- Read and write whole numbers.

Solution to the Crossword problem.



Learning Objective:

- Solve mathematical problems or puzzles.
- Use known number facts and place value to add and subtract mentally.
- Read and write whole numbers.

Thank You

The background is a smooth gradient of blue, transitioning from a darker shade on the left to a lighter, cyan shade on the right. At the bottom, there are several overlapping, wavy bands. The topmost band is a bright yellow, followed by a light blue band, and then a white band at the very bottom. The overall design is clean and modern.

References and additional resources.

These units were organised using advice given at:

http://www.edu.dudley.gov.uk/numeracy/problem_solving/Challenges%20and%20Blocks.doc

PowerPoint template published by www.ksosoft.com

These Mental Maths challenges can be found as a PDF file at :

http://www.edu.dudley.gov.uk/numeracy/problem_solving/Mathematical%20Challenges%20Book.pdf

The questions from this PowerPoint came from:

Mathematical challenges for able pupils in Key Stages 1 and 2

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