

# Mathematical challenges for able pupils

Year 1 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:

$$5p + 2p$$

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

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

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

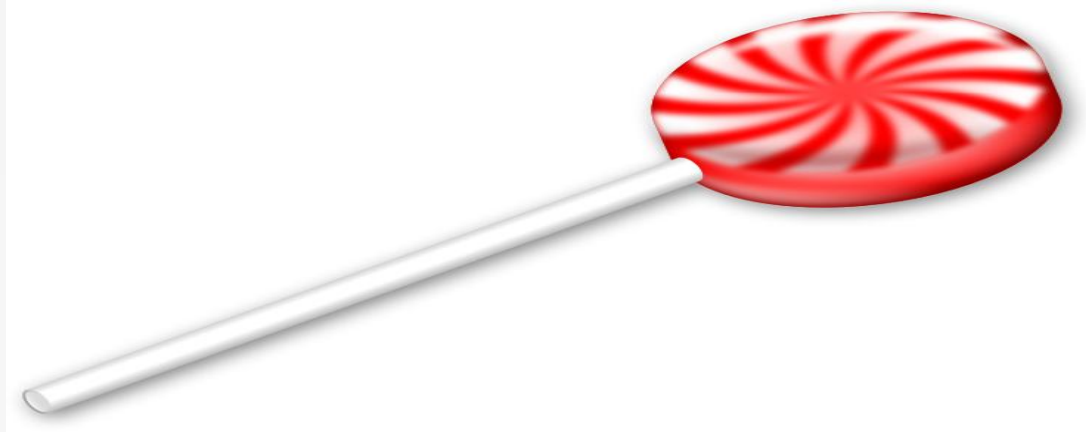
$$2p + 1p + 1p + 1p + 1p + 1p$$

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

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

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

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

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

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

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.

# 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.



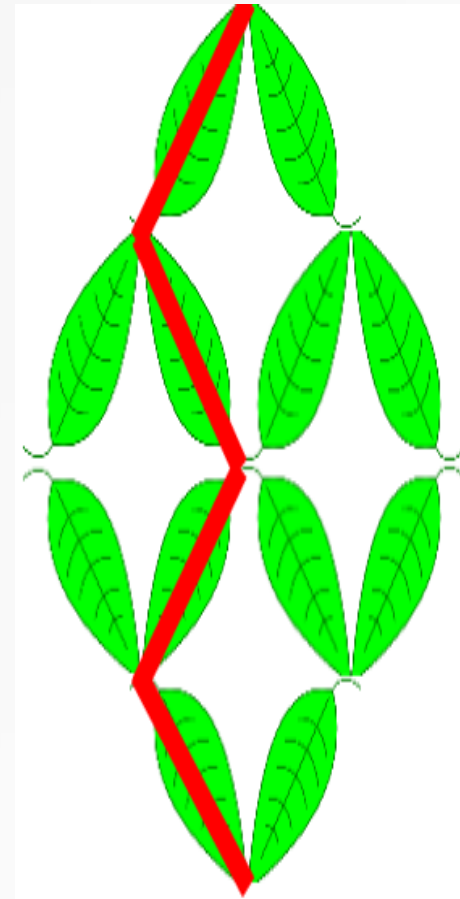
# Jack and the beanstalk

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

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# Solution to Monster

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**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:

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**one 20p and two 10p**

**five 10p**

**one 50p**

***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 of the image, there is a decorative wavy ribbon. The ribbon consists of three distinct layers: a top layer of bright yellow, a middle layer of light blue, and a bottom layer of white. The layers are slightly offset from each other, creating a sense of depth and movement.

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

**PowerPoint template published by [www.ksosoft.com](http://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](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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