I SEE PROBLEM SOLVING - LKS2

MATHS TASKS FOR TEACHING PROBLEM-SOLVING

SAMPLE

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I SEE PROBLEM-SOLVING – LKS2

Sample Tasks

This is a free copy of five sample tasks from **I See Problem-Solving – LKS2.**

The full resource is due to be released on **Sunday 29th September**. It is expected that there will be 52 tasks in the full resource, covering all areas of the maths curriculum. It will be delivered via Etsy as a PDF digital download.

The ***Worked Examples*** for these tasks can also be downloaded for free, modelling the solutions for each task step-by-step.

For information about I See Problem-Solving – UKS2, click here:

I See Problem-Solving – UKS2

For more information about the I See Reasoning eBooks, click on the links below:

I See Reasoning – KS1

I See Reasoning – LKS2

I See Reasoning – UKS2

Task A Build: Making 3-digit numbers

Teacher notes: Representations of 230 are correct; representations of 203 and 210 incorrect.

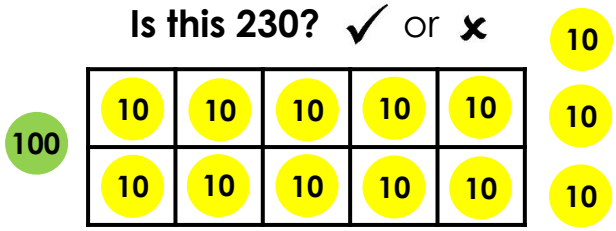
BUILD

Is this 230? ✓ or ✗

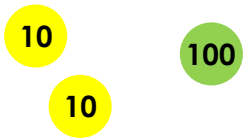
Is this 203? ✓ or ✗

20 + 3

Is this 230? ✓ or ✗



Is this 210? ✓ or ✗



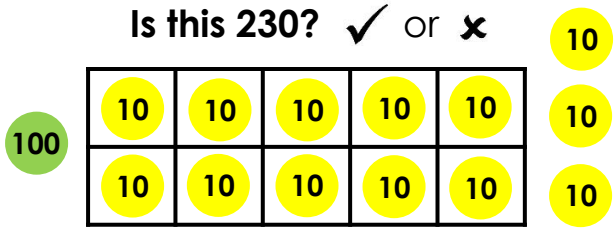
BUILD

Is this 230? ✓ or ✗

Is this 203? ✓ or ✗

20 + 3

Is this 230? ✓ or ✗



Is this 210? ✓ or ✗

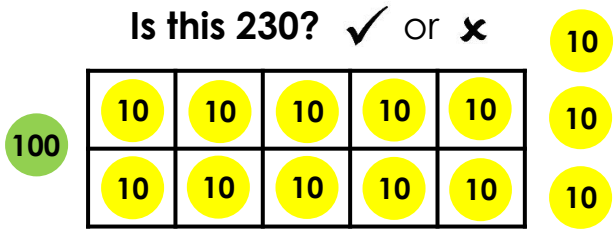
BUILD

Is this 230? ✓ or ✗

Is this 203? ✓ or ✗

20 + 3

Is this 230? ✓ or ✗



Is this 210? ✓ or ✗

Task A: Making 3-digit numbers

Teacher notes: 4 ways: Three 100s and four 10s; two 100s and fourteen 10s; one 100 and twenty-four 10s; thirty-four 10s. Solutions are shown in the *Worked Example* (download from www.iseemaths.com/problem-solving-LKS2).

TASK

How can 340 be made using 10 and 100 counters?

Level 1: I can find a way
Level 2: I can find different ways
Level 3: I know how many ways there are

100 10

TASK

How can 340 be made using 10 and 100 counters?

Level 1: I can find a way
Level 2: I can find different ways
Level 3: I know how many ways there are

100 10

TASK

How can 340 be made using 10 and 100 counters?

Level 1: I can find a way
Level 2: I can find different ways
Level 3: I know how many ways there are

100 10

TASK

How can 340 be made using 10 and 100 counters?

Level 1: I can find a way
Level 2: I can find different ways
Level 3: I know how many ways there are

100 10

TASK

How can 340 be made using 10 and 100 counters?

Level 1: I can find a way
Level 2: I can find different ways
Level 3: I know how many ways there are

100 10

Task A Prompts: Making 3-digit numbers

Teacher notes: *Explain:* 4 hundreds; 16 tens; 46 tens; 12 ones; 102 ones.
Extend: Fewest coins is 9 (four 100s, two 10s, three 1s); most coins is 423 (just using 1s).
423 with 18 coins: three 100s, twelve 10s, three 1s OR four 100s, one 10, thirteen 1s.

SUPPORT

Tip 1: 340 can be made with two 100 coins and some 10 coins.
How many 10 coins would be needed?

Tip 2: 340 can be made using only 10 coins.
How many 10 coins would be needed?

Remember: ten lots of 10 = 100

EXPLAIN

460 can be made with ☐ hundreds and **6** tens.

460 can be made with **3** hundreds and ☐ tens.

460 can be made with ☐ tens.

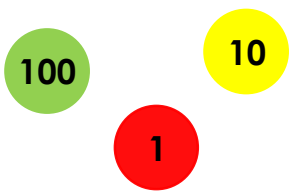
342 can be made with **3** hundreds, **3** tens and ☐ ones.

342 can be made with **2** hundreds, **4** tens and ☐ ones.

EXTEND

How can 423 be made using 1, 10 and 100 counters?

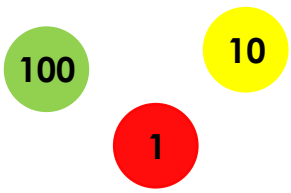
What are the fewest coins that can be used?
What are the most coins that can be used?
There are two ways to make 423 using 18 coins. Find them.



EXTEND

How can 423 be made using 1, 10 and 100 counters?

What are the fewest coins that can be used?
What are the most coins that can be used?
There are two ways to make 423 using 18 coins. Find them.



Task B Build: Consecutive numbers

Teacher notes: Draw attention to efficient calculation strategies e.g. for 6+5+4, do 6+4 then add 5. Make the connection between 2+3+5+3+2 and 3 lots of 5 (two lots of 2+3, one 5).

BUILD

'Say three consecutive numbers.' ✓ or ✗

4, 5, 7 | 9, 10, 11 | 2, 3, 4, 5

Circle the number sentences that are equal to 15:

1 + 3 + 5 + 7 | 2 + 3 + 4 + 5 | 2 + 3 + 5 + 3 + 2

6 + 5 + 4 | 1 + 2 + 3 + 4 + 5

BUILD

'Say three consecutive numbers.' ✓ or ✗

4, 5, 7 | 9, 10, 11 | 2, 3, 4, 5

Circle the number sentences that are equal to 15:

1 + 3 + 5 + 7 | 2 + 3 + 4 + 5 | 2 + 3 + 5 + 3 + 2

6 + 5 + 4 | 1 + 2 + 3 + 4 + 5

BUILD

'Say three consecutive numbers.' ✓ or ✗

4, 5, 7 | 9, 10, 11 | 2, 3, 4, 5

Circle the number sentences that are equal to 15:

1 + 3 + 5 + 7 | 2 + 3 + 4 + 5 | 2 + 3 + 5 + 3 + 2

6 + 5 + 4 | 1 + 2 + 3 + 4 + 5

Task B: Consecutive numbers

Teacher notes: The sum of three consecutive numbers is the same as the middle number multiplied by 3. Examples: $3 + \mathbf{4} + 5 = 3 \times \mathbf{4}$; $20 + \mathbf{21} + 22 = 3 \times \mathbf{21}$. Once children find this pattern with one example, they see if the pattern works for other examples. Explain the pattern using visual representations e.g. 10-frames. An example solution is shown in the *Worked Example* (download from www.iseemaths.com/problem-solving-LKS2).

TASK

Think of **three consecutive numbers**. These are your numbers.

Add your numbers.

Multiply your middle number by 3.

What do you notice? Explain.

TASK

Think of **three consecutive numbers**. These are your numbers.

Add your numbers.

Multiply your middle number by 3.

What do you notice? Explain.

TASK

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What do you notice? Explain.

TASK

Think of **three consecutive numbers**. These are your numbers.

Add your numbers.

Multiply your middle number by 3.

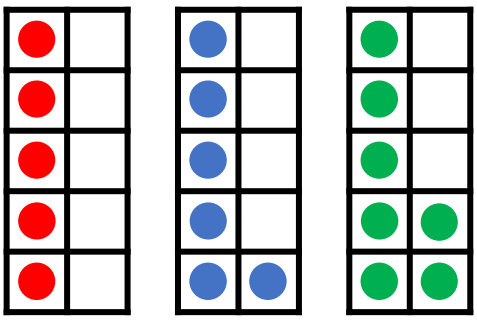
What do you notice? Explain.

Task B Prompts: Consecutive numbers

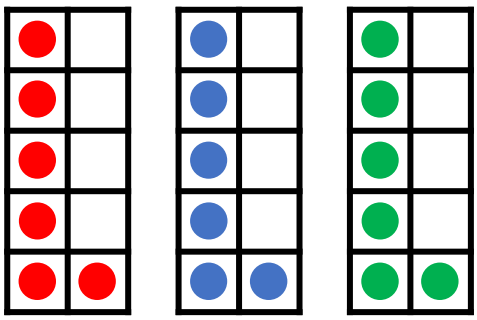
Teacher notes: *Explain:* True. When you have two consecutive numbers, one number is always odd and the other number is always even. An odd number plus an even number always gives an odd number.
Extend: Q1: 9, 10, 11 6, 7, 8, 9 4, 5, 6, 7, 8 Q2: 15

SUPPORT

This picture shows 5 + 6 + 7



This picture shows 3 × 6



Explain why 5 + 6 + 7 gives the same answer as 3 × 6.

EXPLAIN

Agree or disagree:

'When I add two consecutive numbers, the answer is never in the two times tables.'

Explain.

EXTEND

Examples: consecutive numbers add up to make 18:

5, 6, 7 **3, 4, 5, 6**

Q1: Which consecutive numbers add up to make 30?
There are 3 possible answers.

Q2: I think of a number. It is less than 20. I can make this number by adding two, three or five consecutive numbers. **What is my number?**

Task C Build: Largest product

Teacher notes: 13×2 is the smallest as the largest digit (3) is in the ones position. 21×3 is larger than 31×2: note that 20×3 is the same as 30×2 but 1×3 is larger than 1×2.

BUILD

Step 1 - Predict: Which calculation do you think will give the largest product? Which will give the smallest product?

21 × 3 12 × 3 13 × 2 31 × 2

Step 2 – Calculate: What do you find? Is this what you predicted?

BUILD

Step 1 - Predict: Which calculation do you think will give the largest product? Which will give the smallest product?

21 × 3 12 × 3 13 × 2 31 × 2

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BUILD

Step 1 - Predict: Which calculation do you think will give the largest product? Which will give the smallest product?

21 × 3 12 × 3 13 × 2 31 × 2

Step 2 – Calculate: What do you find? Is this what you predicted?

Task C: Largest product

Teacher notes: 43×5=215, largest possible product. Note 53×4 is smaller: 40×5 is the same as 50×4 but 3×5 is larger than 3×4. The solution, and other likely answers, are compared in the *Worked Example* (download from www.iseemaths.com/problem-solving-LKS2).

TASK

Position the digits 3, 4 and 5 to make the product as large as possible.

3 4 5 □□ × □ =

TASK

Position the digits 3, 4 and 5 to make the product as large as possible.

3 4 5 □□ × □ =

TASK

Position the digits 3, 4 and 5 to make the product as large as possible.

3 4 5 □□ × □ =

TASK

Position the digits 3, 4 and 5 to make the product as large as possible.

3 4 5 □□ × □ =

TASK

Position the digits 3, 4 and 5 to make the product as large as possible.

3 4 5 □□ × □ =

Task C Prompts: Largest product

Teacher notes: *Explain*: note that 40 × 5 is the same as 50 × 4 but 6 × 5 is larger than 6 × 4
Extend: largest is 543 × 6 smallest is 456 × 3

SUPPORT

Useful multiplication facts:

3 × 4 = 12	3 × 5 = 15	4 × 5 = 20
30 × 4 = 120	30 × 5 = 150	40 × 5 = 200
40 × 3 = 120	50 × 3 = 150	50 × 4 = 200

EXPLAIN

Complete the calculations:

46 × 5

	40	6
5		

56 × 4

	50	6
4		

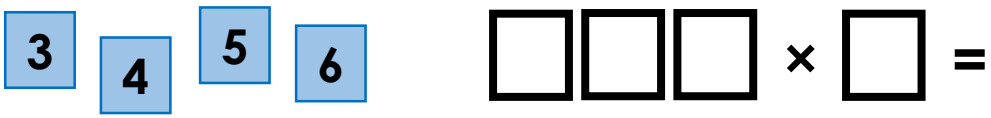
What's the same? What's different?

EXTEND

Position the digits 3, 4, 5 and 6 to make the product as large as possible. Do it again to make the product as small as possible.

EXTEND

Position the digits 3, 4, 5 and 6 to make the product as large as possible. Do it again to make the product as small as possible.

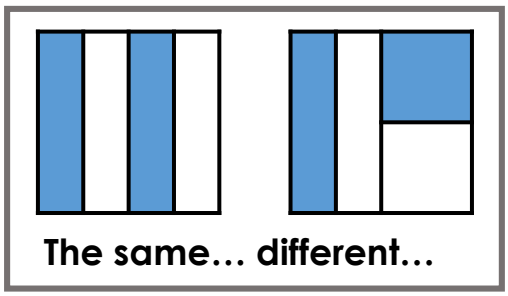


Task D Build: Fraction of a shape

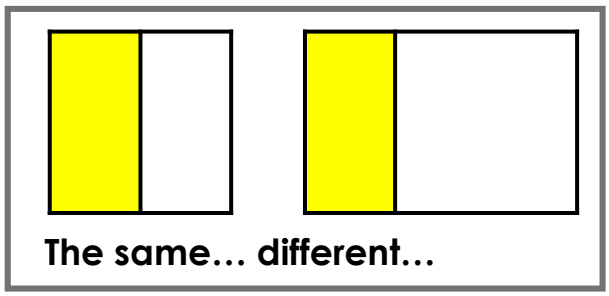
Teacher notes: Blue parts are the same size but different shapes so both shapes are half blue. Yellow parts are the same size but for the right-hand shape the whole is larger so the fraction yellow is smaller. Both of the bottom shapes are half-purple as the parts/whole are identical – it's harder to identify the right-hand shape as being half purple as the white half is split in two differently sized sections.

BUILD

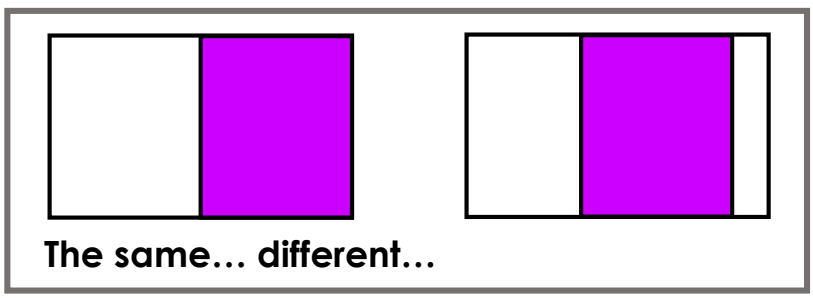
For each pair of shapes, **what is the same? What is different?**



The same… different…



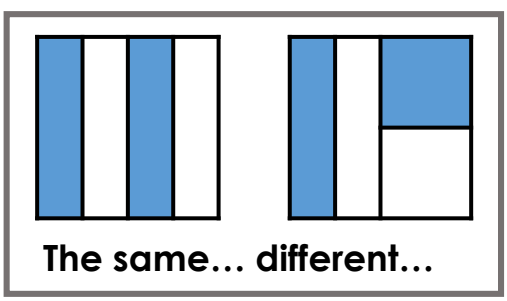
The same… different…



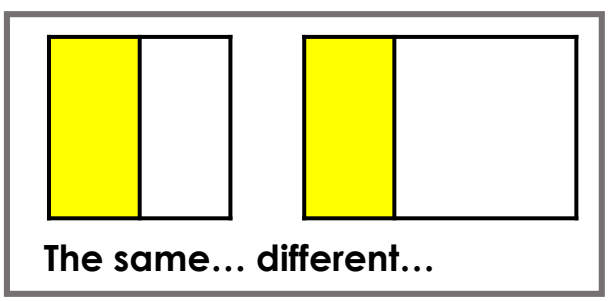
The same… different…

BUILD

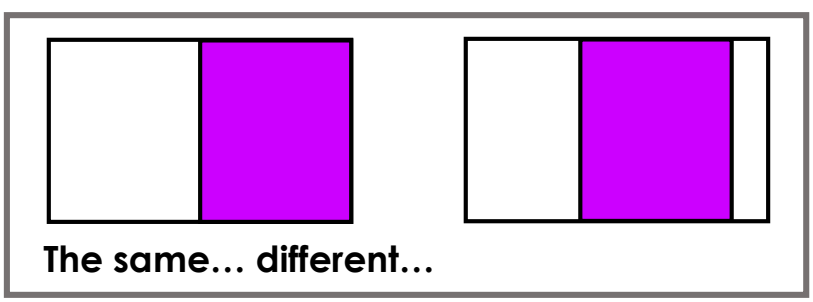
For each pair of shapes, **what is the same? What is different?**



The same… different…



The same… different…



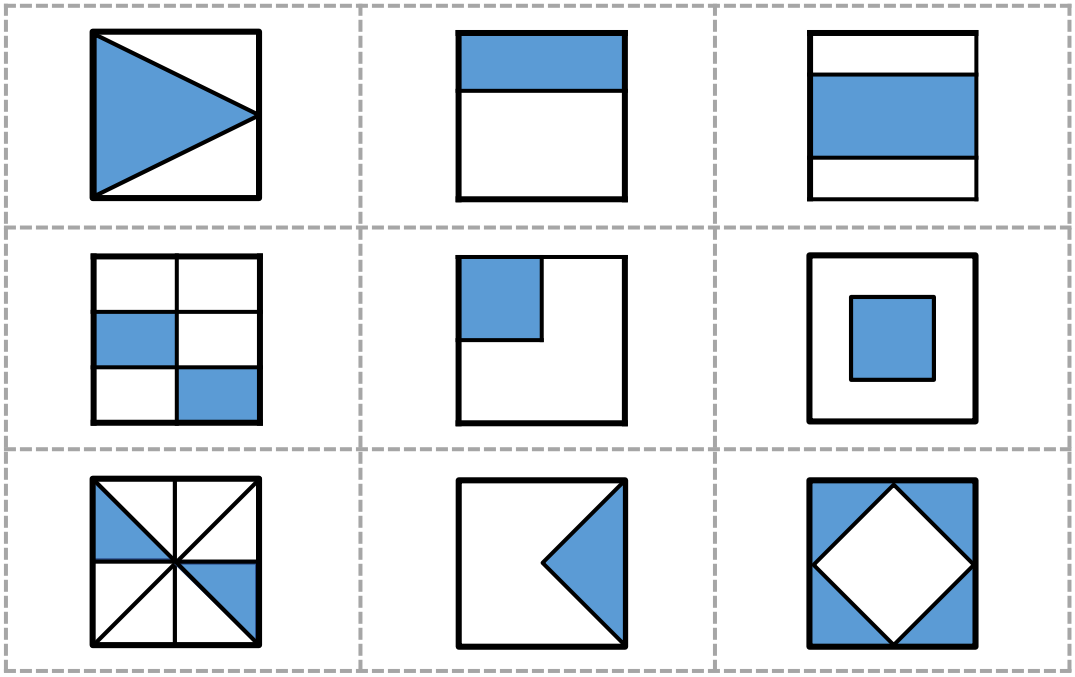
The same… different…

Task D: Fraction of a shape

Teacher notes: Print off and cut out the shapes for each pair/small group. Top row (left to right): $\frac{1}{2}, \frac{1}{3}, \frac{1}{2}$. Middle row (left to right): $\frac{1}{3}, \frac{1}{4}, \frac{1}{4}$. Bottom row (left to right): $\frac{1}{4}, \frac{1}{4}, \frac{1}{2}$. Solutions are shown in the *Worked Example* (download from www.iseemaths.com/problem-solving-LKS2).

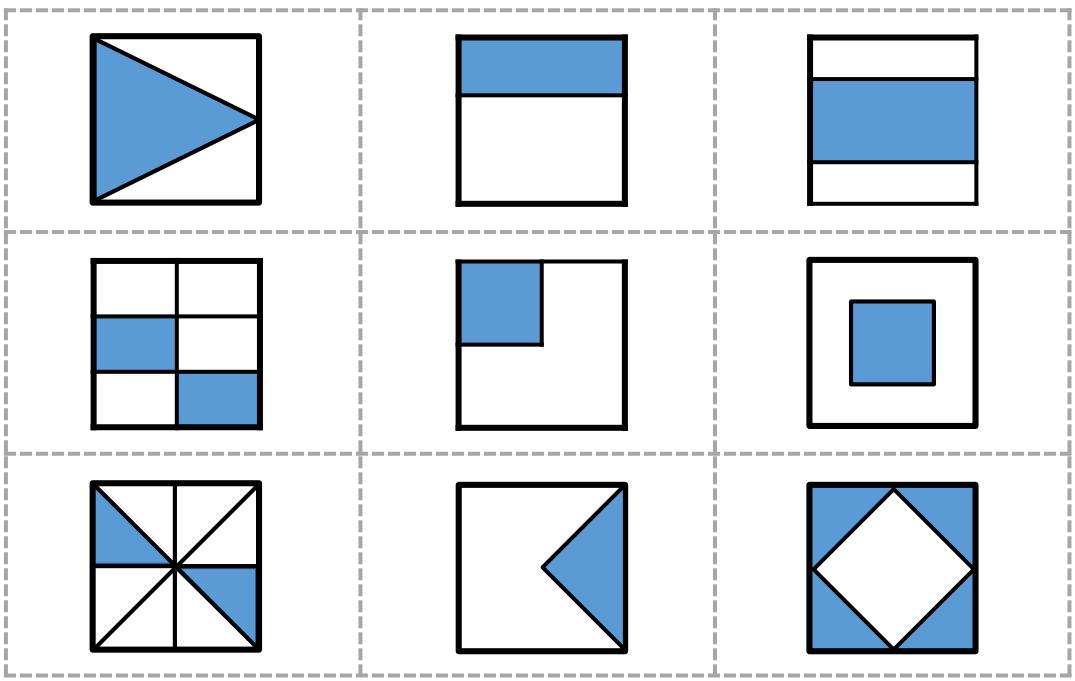
TASK

Sort the shapes into three groups: $\frac{1}{2}$ blue $\frac{1}{3}$ blue $\frac{1}{4}$ blue



TASK

Sort the shapes into three groups: $\frac{1}{2}$ blue $\frac{1}{3}$ blue $\frac{1}{4}$ blue



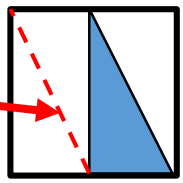
Task D Prompts: Fraction of a shape

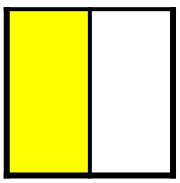
Teacher notes: *Explain*: shape A is $\frac{3}{4}$ shaded. Despite having a larger shaded part, shape B is less than $\frac{3}{4}$ shaded. The white part of shape B is more than $\frac{1}{4}$ of the shape.
Extend: children might attempt this by estimating the correct position of the lines. They could measure the length of each rectangle and use this to calculate the exact position of the lines.

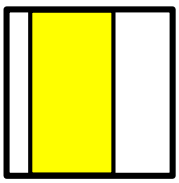
SUPPORT

Example 1

This shape is $\frac{1}{4}$ blue. This dotted line shows the four equally sized parts.







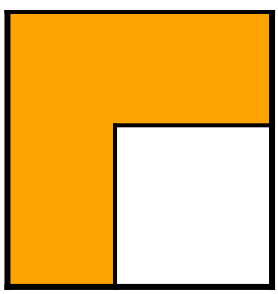
Example 2

Both squares are $\frac{1}{2}$ yellow. The squares and the yellow parts are the same size in both shapes.

EXPLAIN

Shape A

Shape B



Which shape has the **larger fraction shaded?**

Explain.

EXTEND

The dotted line splits the rectangle into a part of $\frac{1}{4}$ and a part of $\frac{3}{4}$

Draw **one line** to split the rectangle into parts of $\frac{1}{3}$ and $\frac{2}{3}$

Draw **one line** to split the rectangle into parts of $\frac{2}{5}$ and $\frac{3}{5}$

Explain how you estimated where to position these lines.

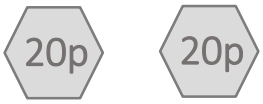
Task E Build: Combinations of change

Teacher notes: Ella gets two 2p coins change. Jess gets three 5p coins change.

BUILD

Ella buys an apple for 36p.

She pays with these coins:



She gets these 2 coins change:

Jess buys an orange for 35p.

She pays with this coin:

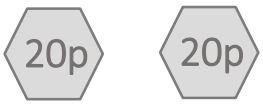
She gets these 3 coins change:

For each example, what are the fewest coins in change that can be given? What are the most coins in change that can be given?

BUILD

Ella buys an apple for 36p.

She pays with these coins:



She gets these 2 coins change:

Jess buys an orange for 35p.

She pays with this coin:

She gets these 3 coins change:

For each example, what are the fewest coins in change that can be given? What are the most coins in change that can be given?

Task E: Combinations of change

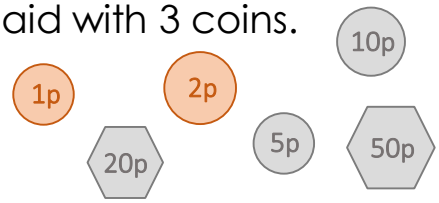
Teacher notes: Paid with 50p, 20p, 10p; 2p, 2p, 1p change. Paid with 50p, 20p & 20p; 3 × 5p change. Kam could have paid £1.10 (£1, 2 × 5p) and got 35p change (20p, 10p, 5p). Practically, though, you wouldn't give more than a £1 coin to pay 75p. Solutions are shown in the *Worked Example* (download from www.iseemaths.com/problem-solving-LKS2).

TASK

Kam bought a toy that costs 75p. He paid with 3 coins.
He was given 3 coins change.

Which coins could have been used?

There are two possible answers.



Answer 1

Kam paid using these coins:

He got these coins in change:

Answer 1

Kam paid using these coins:

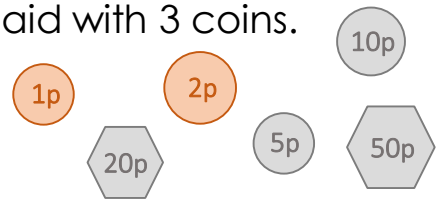
He got these coins in change:

TASK

Kam bought a toy that costs 75p. He paid with 3 coins.
He was given 3 coins change.

Which coins could have been used?

There are two possible answers.



Answer 1

Kam paid using these coins:

He got these coins in change:

Answer 1

Kam paid using these coins:

He got these coins in change:

Task E Prompts: Combinations of change

Teacher notes: *Support:* Mistake 1: paid less than 75p. Mistake 2: 15p change should be given. *Explain:* 47p 4 coins (2 × 20p, 5p, 2p). 38p 5 coins (20p, 10p, 5p, 2p, 1p). 6 coins: 88p, 89p, 98p, 99p. *Extend:* 4 possible answers. Paid 50p, 5p, 5p, 5p. Paid 50p, 10p, 10p; change 5p. Paid 50p, 20p, 5p; change 10p. Paid £1; change 20p, 10p, 5p.

SUPPORT

Kam bought a toy that costs 75p. He paid with 3 coins.
He was given 3 coins change.

Explain the mistakes:

Mistake 1

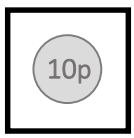
Kam paid using these coins:

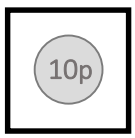
He got these coins in change:

Mistake 2

Kam paid using these coins:

He got these coins in change:





EXPLAIN

To make **47p** you need to use at least ☐ coins.

To make **38p** you need to use at least ☐ coins.

To make ☐ **p** you need to use at least **6** coins.

EXTEND

Amy bought some stickers that cost 65p.
4 coins were exchanged with the shopkeeper.

Which coins were exchanged?

There are different possible answers.

Amy gave the shopkeeper…
The coins she got in change were…

I SEE MATHS RESOURCES

A range of resources for developing deep, visual mathematics can be found at www.iseemaths.com

I See Problem-Solving is also available for UKS2. For more information, click on the link:

I See Problem-Solving – UKS2

The ***I See Reasoning*** eBooks provide a range of thought-provoking tasks and questions for embedding reasoning in daily lessons. For further information, click on the links below:

I See Reasoning – UKS2

I See Reasoning – LKS2

I See Reasoning – KS1

iPad app Logic Squares gets children applying calculation facts and thinking strategically as children complete crossword-style number sentences.

Information about conferences and in-school training led by Gareth Metcalfe can be found at www.iseemaths.com

Social Media:

Twitter: @gareth_metcalfe

Facebook: Gareth Metcalfe Primary Maths

Pinterest: I See Maths