



Apley Wood Problem Solving Progression – Logic problems

EYFS

Key Skills and Strategy Development EYFS	Question stems
Identify the starting point by generalising or classifying.	Where is your starting point? Which is the best clue? What do you know is true?
Check solutions match the criteria.	Have I answered the question?

Example problems	Model answers	Links
Early Years Activities - Number		https://nrich.maths.org/13372
Early Years Activities - Measures		https://nrich.maths.org/13374

KS1

Key Skills and Strategy Development KS1	Question stems																			
Identify the starting point by generalising or classifying.	Where is your starting point? Which is the best clue? What do you know is true?																			
Check solutions match the criteria.	Have I answered the question?																			
Example problems	Model answers	Links																		
 <ul style="list-style-type: none"> • Mr Yellow, Mr Brown and Mr Green were wearing ties of yellow, brown and green. • Mr Brown said, "We all are wearing ties of a colour which does not match with our name." • Mr Yellow says, "Yes, you are absolutely right." • Who was in the green tie? Can you say which person wears the tie of which colour? 	 <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Mr Green</td> <td>Mr Yellow</td> <td>Mr Brown</td> </tr> <tr> <td>B</td> <td>G</td> <td>Y</td> </tr> <tr> <td>Y</td> <td>B</td> <td>G</td> </tr> </table>	Mr Green	Mr Yellow	Mr Brown	B	G	Y	Y	B	G										
Mr Green	Mr Yellow	Mr Brown																		
B	G	Y																		
Y	B	G																		
<p>1 2 3 4 5 6 7 8 9</p> <p>Use the clues to write the digits 1 to 9 in the grid.</p> <p>A: This digit is odd. B: This digit is less than 2. C: This digit is half of 12. D: This digit is 1 more than E. E: This digit is equal to 3 + 4. F: This digit is 2 more than B. G: This digit is between 1 and 3 H: This digit is even. I: This is the largest digit.</p>	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>A</td><td>5</td><td>B</td><td>1</td><td>C</td><td>6</td> </tr> <tr> <td>D</td><td>8</td><td>E</td><td>7</td><td>F</td><td>3</td> </tr> <tr> <td>G</td><td>2</td><td>H</td><td>4</td><td>I</td><td>9</td> </tr> </table>	A	5	B	1	C	6	D	8	E	7	F	3	G	2	H	4	I	9	
A	5	B	1	C	6															
D	8	E	7	F	3															
G	2	H	4	I	9															
<p>Use four different number cards to complete the number sentences below.</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="border: 1px solid black; padding: 2px;">5</td> <td style="border: 1px solid black; padding: 2px;">15</td> <td style="border: 1px solid black; padding: 2px;">25</td> <td style="border: 1px solid black; padding: 2px;">35</td> <td style="border: 1px solid black; padding: 2px;">45</td> <td style="border: 1px solid black; padding: 2px;">55</td> </tr> </table> <p style="margin-left: 40px;"> <input style="width: 30px; height: 20px;" type="text"/> + <input style="width: 30px; height: 20px;" type="text"/> = <input style="width: 30px; height: 20px; text-align: center; border: 1px solid black;" type="text"/> 60 </p> <p style="margin-left: 40px;"> <input style="width: 30px; height: 20px;" type="text"/> + <input style="width: 30px; height: 20px;" type="text"/> = <input style="width: 30px; height: 20px; text-align: center; border: 1px solid black;" type="text"/> 60 </p>	5	15	25	35	45	55	$35 + 25 = 60$ $45 + 15 = 60$ $55 + 5 = 60$	SATS paper												
5	15	25	35	45	55															
<p>5</p> <p style="margin-left: 40px;"> <input style="width: 30px; height: 20px;" type="text"/> × <input style="width: 30px; height: 20px;" type="text"/> = 25 </p>	$5 \times 5 = 25$	SATS paper																		

11 Junaid has sorted some numbers in the table below.
The numbers must be greater than 10 but less than 50
Circle the number that is in the wrong place in the table.

Odd numbers		Even numbers	
45	17	32	64
28	23	16	44
	15	20	

Put one more number in each group in the table.

Wrong – 28

Numbers added – more than 10 but smaller than 50

SATS paper

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.

$$2 + 5 + 3 + ? = 16 \quad ? = 6$$

$$6 + 2 + ? = 16 \quad ? = 8$$

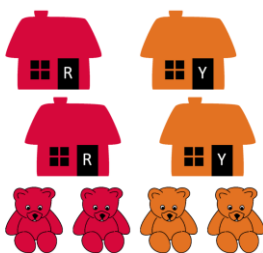
$$8 + 2 + ? + ? = 16 \quad ? = 4 + 2$$

(more possibilities)

Badger maths

Teddy Town

In Teddy Town, teddies are either red or yellow and they live in red or yellow houses. There are 4 teddies - 2 red and 2 yellow, and 4 houses - 2 red and 2 yellow.



Use images of coloured cubes

<https://nrich.maths.org/108>

Space Explorer!

Three new planets have been discovered by space explorer Zago. Can you work out the colour of each planet?

Clues

- Argona is **not** the red planet.
- The blue planet made of ice, is **not** Beta 12.
- Chrona is **not** red or orange in colour.
- The purple planet (with purple life forms) is **not** Beta 12 or Argona.
- Dozplek is a bright orange planet with a green moon!



	Blue	Purple	Red	Orange
Planet Argona				
Planet Beta 12				
Planet Chrona				
Planet Dozplek				

Twinkl logic problem
KS1 – level one

Lower KS2

Key Skills and Strategy Development LKS2	Question stems																									
Identify the starting point by generalising or classifying.	Where is your starting point? Which is the best clue? What can you place with certainty? Is your deduction accurate?																									
Check solutions match the criteria.	Have I answered the entire question?																									
Example problems	Model answers	Links																								
<p>Use different whole numbers to complete the diagram.</p>	<p>2 x 24 48 x 1 3 x 16 6 x 8 12 x 4</p>	SATS question																								
<p>Use four different whole numbers to complete the sentences.</p> <p><input type="text"/> x <input type="text"/> = 24</p> <p><input type="text"/> x <input type="text"/> = 24</p>	<p>6 x 4 8 x 3 12 x 2</p>	SATS question																								
<p>Here are six number cards. They are all factors of the same number.</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="border: 1px solid black; padding: 2px;">3</td> <td style="border: 1px solid black; padding: 2px;">4</td> <td style="border: 1px solid black; padding: 2px;">6</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">8</td> <td style="border: 1px solid black; padding: 2px;">12</td> <td style="border: 1px solid black; padding: 2px;">16</td> </tr> </table> <p>Use the cards to complete 3 factor pairs.</p> <p><input type="text"/> x <input type="text"/></p> <p><input type="text"/> x <input type="text"/></p> <p><input type="text"/> x <input type="text"/></p> <p>Write one more factor pair for this number.</p> <p><input type="text"/> x <input type="text"/></p>	3	4	6	8	12	16	<p>3 x 16 4 x 12 6 x 8 2 x 24</p>	SATS question																		
3	4	6																								
8	12	16																								
<p>Numbers of boys and girls</p> <p>Use these clues to find the number of boys and girls in each class.</p> <p>There are a total of 114 children in the school.</p> <p>There are 14 girls in Class 2.</p> <p>Class 4 has twice as many girls as class 2.</p> <p>No class has the same number of children.</p> <p>There are 52 boys in the school in total.</p> <p>In class 1 there are half as many boys as in class 2.</p> <p>In class 2 there are a total of 30 children.</p> <p>In class 3 there are an equal number of girls and boys.</p> <p>In class 4 there are 10 boys.</p> <p>There are a different number of boys and girls in the school.</p>	<p>Numbers of boys and girls</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>Class 1</th> <th>Class 2</th> <th>Class 3</th> <th>Class 4</th> <th>Total</th> </tr> </thead> <tbody> <tr> <th>Girls</th> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>Boys</th> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>Total</th> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Class 1	Class 2	Class 3	Class 4	Total	Girls						Boys						Total						
	Class 1	Class 2	Class 3	Class 4	Total																					
Girls																										
Boys																										
Total																										

Ryan thinks of a 4-digit whole number where every digit is different. Use the clues to work out Ryan's number.	All digits are even.	Ryan's number is smaller than 4500.
The third digit is not 8.	Ryan's number is a multiple of 5.	Ryan's number is between 4000 and 5000.

Megan thinks of a sequence of four 2-digit numbers. Use the clues to work out the numbers in the sequence.	The first number in the sequence is an odd number.	All of the numbers are multiples of 5.
The last number in the sequence is less than 50.	The sequence goes up in regular steps.	9 is a factor of the last number in the sequence.

Which is the best clue? All digits are even.

Which is the best clue? All the numbers are multiples of 5.

Four children each own one pet. Use the clues below to find out which pet each child has.



	Cat	Dog	Bird	Fish
Bob				
Mary				
Cathy				
Sue				

- The boy has a dog.
- Sue has a pet with 2 legs.
- Mary does NOT have a fish.



	Cat	Dog	Bird	Fish
Bob	X	O	X	X
Mary	O	X	X	X
Cathy	X	X	X	O
Sue	X	X	O	X

<https://www.math-salamanders.com/math-logic-problems.html>

Each of the five boys like a school subject best. Use the clues below to find out the favorite subject of each boy.

	Math	Science	Reading	Writing	Recess
Joe					
Jack					
Abe					
Carl					
George					

- Joe likes Reading better than any other subject.
- Neither Carl nor George enjoy Math.
- Abe's favorite subject is either Reading or Recess.
- George enjoys writing more than the other boys.

	Math	Science	Reading	Writing	Recess
Joe	X	X	O	X	X
Jack	O	X	X	X	X
Abe	X	X	X	X	O
Carl	X	O	X	X	X
George	X	X	X	O	X

<https://www.math-salamanders.com/math-logic-problems.html>

What Do You Need?

Age 7 to 11
Challenge Level ★

What do you need to find a number chosen from this hundred square?

0	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

The clues that you need are:
The number is a multiple of 7.
The number is odd.
Its ones digit is larger than its tens digit.
Its tens digit is odd.

The clues that you don't need are:
The number is greater than 9.
The number is not a multiple of 10.
The number is not a multiple of 11.
The number is less than 200.

<https://nrich.maths.org/5950/index>

A Square of Numbers

Age 7 to 11
Challenge Level *

Can you put the numbers 1 to 8 into the circles so that the four calculations are correct?

$$\begin{array}{r} \textcircled{?} + \textcircled{?} = \textcircled{?} \\ - \textcircled{?} \quad \times \textcircled{?} \\ \textcircled{?} + \textcircled{?} = \textcircled{?} \end{array}$$

$$\begin{array}{r} \textcircled{6} \div \textcircled{3} = \textcircled{2} \\ - \textcircled{5} \quad \times \textcircled{4} \\ \textcircled{1} + \textcircled{7} = \textcircled{8} \\ \textcircled{8} \div \textcircled{4} = \textcircled{2} \\ - \textcircled{7} \quad \times \textcircled{3} \\ \textcircled{1} + \textcircled{5} = \textcircled{6} \end{array}$$

<https://nrich.maths.org/2005>

		Fossil			Dinosaur		
		Egg	Tail bone	Tooth	Oviraptor	T-rex	Diplodocus
Fossil hunter	Doug Dig						
	Harriet Hammer						
	Sofia Sands						
Dinosaur	Oviraptor						
	T-Rex						
	Diplodocus						

Challenge

Try to solve the puzzle using clues 1 to 4 only! It will help to fill in the table with the information you have found out.



Clues

- Doug Dig found a tail bone from a Diplodocus.
- The person who found the huge T-rex tooth was relieved that they would never see a living dinosaur!
- Harriet Hammer did **not** find a tail bone from a dinosaur.
- Sofia Sands thought that the fossilised dinosaur egg was just a pebble at first!

Extra clues

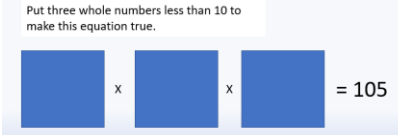



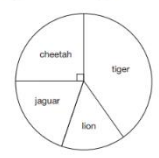


- Harriet Hammer discovered the T-rex fossil.
- The Oviraptor egg was 14cm long!

		Fossil			Dinosaur		
		Egg	Tail bone	Tooth	Oviraptor	T-rex	Diplodocus
Fossil hunter	Doug Dig	x	✓	x	x	x	✓
	Harriet Hammer	x	x	✓	x	✓	x
	Sofia Sands	✓	x	x	✓	x	x
Dinosaur	Oviraptor	✓	x	x			
	T-Rex	x	x	✓			
	Diplodocus	x	✓	x			

Fossil hunter	Fossil	Dinosaur
Doug Dig		
Harriet Hammer		
Sofia Sands		


Twinkl logic problem
KS2 – level two

Upper KS2

Key Skills and Strategy Development UKS2	Question Stems	
Identify the starting point by generalising or classifying. Manage positive and negative information.	Where is the most useful information? What are the generalisations and rules? What can you place with certainty? Can you eliminate information?	
Check solutions match the criteria.	How shall I present the solution? In a table? Have I answered the entire question?	
Example problems	Model answers	Links
<p>Put three whole numbers less than 10 to make this equation true.</p> 		
<p>Here are four number cards.</p>  <p>Layla uses each card once to make a four-digit number.</p> <p>She places:</p> <ul style="list-style-type: none"> • 4 in the tens column • 2 so that it has a higher value than any of the other digits • the remaining two digits so that 7 has the higher value. <p>Write a digit in each box to show Layla's number.</p> 	<p style="text-align: center;">_ _ _ _</p> <p style="text-align: center;">2 7 4 3</p>	KS2 SATS paper
<p>This chart shows the number of different types of big cat in a zoo.</p> <p>There are 20 big cats in the zoo altogether.</p>  <p>Here are some statements about the chart.</p> <p>Tick the statements that are true.</p> <p>There are more cheetahs than jaguars. <input type="checkbox"/></p> <p>The total number of lions and tigers is 10. <input type="checkbox"/></p> <p>One-quarter of the big cats are cheetahs. <input type="checkbox"/></p> <p>There are more than 5 jaguars. <input type="checkbox"/></p>	<p>There are more cheetahs than jaguars</p> <p>One quarter of the big cats are cheetahs.</p>	KS2 SATS paper
<p>1 Use each of the digit cards once to fill in the boxes.</p>  	<p>$-7 < -3 < 0$</p>	KS2 SATS paper

Ross, Sam and Tim are brothers.
 The shop sells three kinds of ice cream, strawberry, vanilla and banana.
 Each brother only likes two flavours and each ice cream flavour is only liked by two of the brothers.
 Sam said " Ross likes strawberry and I don't like banana."

Which ice cream does Tim like?



	Ross	Tim	Sam
Strawberry	✓	X	✓
Vanilla	X	✓	✓
Banana	✓	✓	X

Sarah, Jenny, Ranjit and Paul each choose a sandwich filling. They can choose from:

- tuna,
- salad,
- cheese, or
- chicken.

Each child chooses a different filling.

Clues

- Sarah doesn't like fish.
- Jenny cannot eat dairy products.
- Ranjit does not eat meat or fish.
- Jenny doesn't like tuna or chicken.

Which sandwich filling does each child choose?

	Sarah	Jenny	Ranjit	Paul
Tuna	X	X	X	★
Salad	X	★	X	X
Cheese	X	X	★	X
Chicken	★	X	X	X

Nick-names

Dawn, Mark, Josh and Tina are friends.



They each have a nick-name.

Their nick-names are Spider, Curly, Ace and Fudgy, but not in that order.

What is the nick-name of each of the friends?

Clues

- Josh plays tennis with Curly and goes swimming with Ace.
- Tina has been on holiday with Curly but travels to school with Fudgy.
- Spider, Curly and Dawn play in the football team.
- Spider sometimes goes to tea with Josh.

	Spider	Curly	Ace	Fudgy
Dawn	X	X	★	X
Mark	X	★	X	X
Josh	X	X	X	★
Tina	★	X	X	X

Badger maths

Space Explorer!

Four new planets have been discovered by space explorer Zaga. Can you work out the colour of each planet and the order in which Zaga found them?

Planet	Order				Colour			
	First	Second	Third	Fourth	Red	Blue	Purple	Orange
Argona								
Beta 12								
Chrono								
Dozplek								
Red								
Blue								
Purple								
Orange								

Challenge! Try to solve the puzzle using clues 7 to 9 only! It will help to fill in the table with the information you have found out.



Clues

- Argona was the second planet to be discovered by Zaga.
- The colour of Beta 12 is either red or blue.
- The fourth planet discovered by Zaga was bright orange!
- The purple planet (with purple life forms) was discovered first.
- Chrono is not an orange planet.
- The red planet with the yellow moon is not Argona.
- Chrono was the first planet to be discovered. The blue planet is Argona.
- The red planet was third planet that Zaga discovered. He named it Beta 12.

Planet	Order				Colour			
	First	Second	Third	Fourth	Red	Blue	Purple	Orange
Argona	X	✓	X	X	X	✓	X	X
Beta 12	X	X	✓	X	X	X	X	X
Chrono	✓	X	X	X	✓	X	✓	X
Dozplek	X	X	X	✓	X	X	X	✓
Red	X	X	✓	X				
Blue	X	✓	X	X				
Purple	✓	X	X	X				
Orange	X	X	X	✓				

Twinkl logic problem
 KS2 – level three

The coloured shapes stand for eleven of the numbers from 0 to 12. Each shape is a different number.

Can you work out what they are from the multiplications below?

$\square \times \square \times \square = \triangle$ $\square \times \square = \star$
 $\square \times \square = \square$ $\square \times \square = \square$
 $\square \times \square = \square$ $\square \times \square = \square$
 $\square \times \square = \square$ $\square \times \square = \square$
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<https://nrich.maths.org/5714>

You are to make a 5 digit number.	The units digit is a multiple of the ten thousands digit.
All the digits are factors of 36.	The units digit is a square number.
The product of the first two digits is the same as the product of the last two digits.	Two of the digits are odd.
The total of all 5 digits is 24.	When the thousands, hundreds and tens digits are multiplied together, the product is 48.

The most useful information – all the digits are factors of 36.


36, 429

Problem 92 Numbers 123

There are three different numbers.

- They are all four-digit odd numbers.
- The digits of each number add up to 14.
- None of the numbers can be divided by 5.
- These numbers read the same forwards and backwards.

Can you guess the numbers using these clues?



The numbers are 1661, 3443 and 7007.


Badger maths

Problem 97 Measures

Five pupils left their shoes in the changing rooms. Each wore the same brand of shoes, but in a different size. The shoes were sizes 2, 3, 4, 5 and 6.

Tensu knew that his were the smallest. Karen thought hers were bigger than Chan's but smaller than Deirdre's. Brad knew his were the largest.

Which size shoes did each pupil have?



	2	3	4	5	6
Tensu	✓	✗	✗	✗	✗
Karen	✗	✗	✓	✗	✗
Chan	✗	✓	✗	✗	✗
Deirdre	✗	✗	✗	✓	✗
Brad	✗	✗	✗	✗	✓

Badger maths