Addition and Subtraction: Add Whole Numbers with More than 4 Digits

Aim:	**Success Criteria:**	**Resources:**
To add and subtract whole numbers with more than 4 digits, including using formal written methods. To add numbers with up to 6 digits.	I can use a formal written method to add whole numbers with more than 4 digits. I can explain why regrouping is necessary in written calculations. I can regroup more than once when using formal written methods of addition.	Lesson Pack Base ten and place value counters Place value grids
	Key/New Words: Add, addition, sum of, more, plus, increase, sum, total, altogether, regroup.	**Preparation:** Differentiated Flying Machine Materials Sheets - one per pair Flying High Activity Sheets - one per group Diving into Mastery Activity Sheets - as required

Prior Learning: Children may have prior experience adding adding 4-digit numbers, regrouping more than once.

Learning Sequence

	**Remember It:** Children revisit prior learning, using written methods to add 4-digit numbers where it is necessary to regroup more than once. They choose questions from differentiated sections shown on the Lesson Presentation.	
	**Adding Larger Numbers:** Using the models shown on the Lesson Presentation, children are guided through the process of adding whole numbers with up to 6 digits, regrouping more than once. Children will make comparisons using visual aids and formal written methods of calculation. Can children add whole numbers with more than 4 digits?	
	**Draw It or Make it:** Children draw or make the calculations shown on the Lesson Presentation, providing visual representations of what each digit looks like in a given calculation. They show their representations to partners, describing the process of regrouping when calculating from right to left. Can children describe the regrouping within calculations of numbers with more than 4 digits?	
	**Spot the Mathematical Error:** Children spot errors within given mathematical calculations. They give clear reasoning to support their thinking. Can children explain why regrouping is necessary in written calculations?	
	**Flugtag:** Ask children what they can remember about the 'Flugtag' event, using the Lesson Presentation to remind them. Explain that today's task is to choose materials to build their own flying machine within a given budget.	
	**Flying High Activity:** Using the differentiated Flying Machines Materials Sheets and Flying High Activity Sheet, children work in pairs or small groups to choose materials to create their own flying contraption with their given budget. As an extension activity, ask children if they can work out how to spend their budget exactly.  Children use column addition to add together combinations of 4-digit numbers, ensuring that they don't exceed a budget of £15 701. Children may use interlocking cubes, base ten blocks or place value grids to aid understanding of column addition if required.  Children use column addition to add together combinations of 5-digit numbers, ensuring that they don't exceed a budget of £157 943.  Children use column addition to add together combinations of 5- and 6-digit numbers, ensuring that they don't exceed a budget of £133 128.	

	**Diving into Mastery:** Schools using a mastery approach may prefer to use the following as an alternative activity. These sheets might not necessarily be used in a linear way. Some children might begin at the 'Deeper' section and in fact, others may 'dive straight in' to the 'Deepest' section if they have already mastered the skill and are applying this to show their depth of understanding.  Children answer fluency questions by adding numbers with up to six digits using formal written methods.  Children answer reasoning questions based on mistakes made with column additions.  Children answer open-ended, multi-step problem-solving questions in the context of addition.	
	**Take Off!** Take feedback on the children's activities and encourage them to comment on what was learnt. Did any groups manage to spend their budget exactly? Can they model a column addition to prove this?	
	**Checking Our Understanding:** Children review learning by answering addition questions where blank spaces are provided. They fill in the missing digits using their knowledge of regrouping where necessary.	

Exploreit

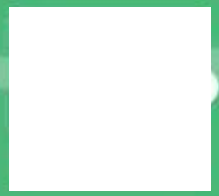
Makeit*:* Children make their own flying machines using materials found within school, creating a materials list with prices and a set of addition problems to go with it.

Learnit: Children will find this visually exciting Knowledge Organiser a useful tool for representing addition and subtraction.

Maths

Addition and Subtraction

Add Whole Numbers with More than 4 Digits



Aim

- To add numbers with up to 6 digits.

Success Criteria

- I can use a formal written method to add whole numbers with more than 4 digits.
- I can explain why regrouping is necessary in written calculations.
- I can regroup more than once when using formal written methods of addition.

Remember It

Choose a section and answer the addition questions.
Remember to regroup where necessary.

★	★★	★★★
1003 + 1561 = 2564	1869 + 1961 = 3830	8202 + 8808 = 17 010
2533 + 1777 = 4310	2868 + 2969 = 5837	6898 + 7509 = 14 407
1705 + 2029 = 3734	1855 + 2829 = 4684	8999 + 6698 = 15 697
	1709 + 2809 = 4518	8797 + 7678 = 16 475
	1623 + 9759 = 11 382	7999 + 6759 = 14 758

Adding Larger Numbers

Add the numbers shown in the model.
Check your answer using column addition.

Ten Thousands	Thousands	Hundreds	Tens	Ones
|	||||	|||||||	||||||	||||||
|	|||||	|||	|||	|||

1 ten thousand add sands add 5 l 3
1 ten thousand add nds add 1 thousand es
1 ten thousand 10 thousands. This his
makes 3 ten thousand and 0 ind
thousands. nds.

6 ones add 3 ones makes 9 ones.

Calculation

$$\begin{array}{r} 14766 \\ +\ 15333 \\ \hline 30099 \\ \hline 1\ 1 \end{array}$$

Adding Larger Numbers

The model and calculation show how multiple regroupings are made when adding numbers with more than four digits.

	1	6	6	9	7	2
+	1	4	9	8	6	4

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
●	●●● ●●●	●●● ●●●	●●● ●●● ●●●	●●● ●●● ●	●●
●	●● ●●	●●● ●●● ●●●	●●● ●●● ●●	●●● ●●●	●● ●●

	1	6	6	9	7	2
+	1	4	9	8	6	4
	3	1	6	8	3	6
	1	1	1	1		

6 ten thousands add 4 ten thousands add 1 ten thousand makes 11 ten thousands. This is 1 hundred thousand and 1 ten thousand.

There are 3 hundred thousands altogether.

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
●	●●● ●●●	●●● ●●●	●●● ●●● ●●●	●●● ●●● ●	●●
●	●● ●●	●●● ●●● ●●●	●●● ●●● ●●	●●● ●●●	●● ●●

Draw It or Make It

The model and calculation show how multiple regroupings are made when adding numbers with more than four digits.

Demonstrate to your partner the process of regrouping when calculating from right to left.

How many times in total did you need to regroup?

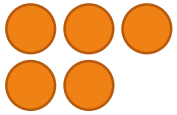
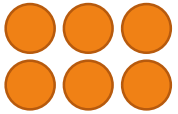
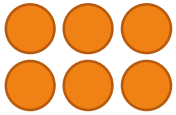
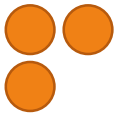
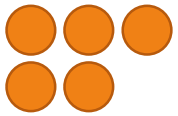
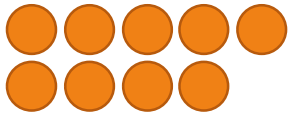
	5	2	7	6	3
+	3	6	3	5	9

Ten Thousands	Thousands	Hundreds	Tens	Ones
●●● ●●	●●	●●●● ●●●	●●● ●●●	●●●
●●●	●●● ●●●	●● ●	●●● ●●	●●●●● ●●●●

How many times in total did you need to regroup?

We needed to regroup 3 times.

	5	2	7	6	3
+	3	6	3	5	9
	8	9	1	2	2
		1	1	1	

Ten Thousands	Thousands	Hundreds	Tens	Ones
				
				

Draw It or Make It

Draw or make the calculation shown, giving your partner a visual representation of what each digit looks like. Demonstrate to your partner the process of regrouping when calculating from right to left. How many times in total did you need to regroup?

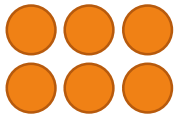
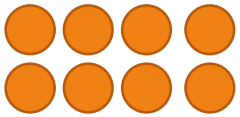
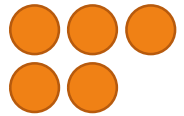
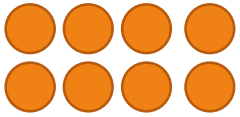
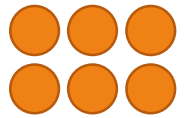
	1	6	4	7	3
+		8	2	7	5
+	2	8	7	3	6

Ten Thousands	Thousands	Hundreds	Tens	Ones
●	●●● ●●●	●● ●●	●●●● ●●●	●●●
	●●●● ●●●●	●●	●●●● ●●●	●●● ●●
●●	●●●● ●●●●	●●●● ●●●	●●●	●●● ●●●

How many times in total did you need to regroup?

We needed to regroup 4 times.

	1	6	4	7	3
+		8	2	7	5
+	2	8	7	3	6
	5	3	4	8	4
	2	1	1	1	

Ten Thousands	Thousands	Hundreds	Tens	Ones
				
				
				

Spot the Mathematical Error

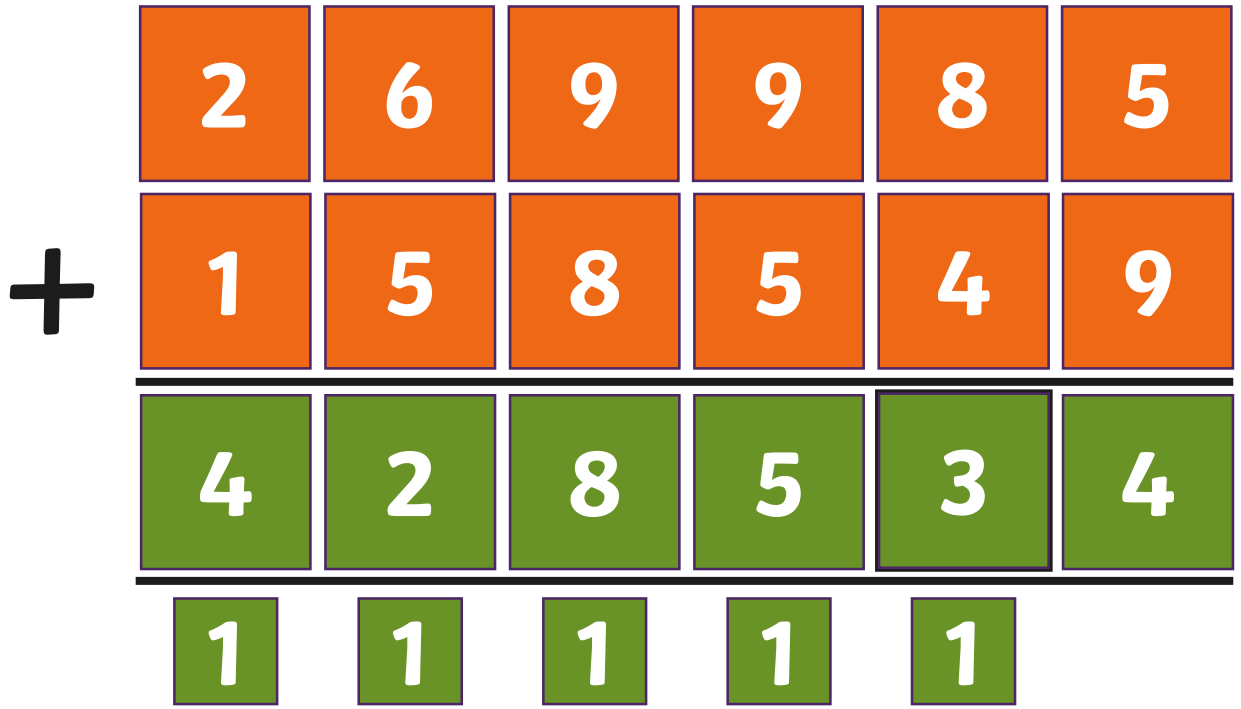
$$\begin{array}{r} 31499 \\ +\ 30977 \\ \hline 72466 \\ \hline 1\ 1\ 1 \end{array}$$

They regrouped into the wrong columns.

$$\begin{array}{r} 31499 \\ +\ 30977 \\ \hline 62476 \\ \hline 1\ 1\ 1 \end{array}$$

When they were working out the price of their materials for their flying machine, one team made a mistake. Can you spot it and correct their calculation?

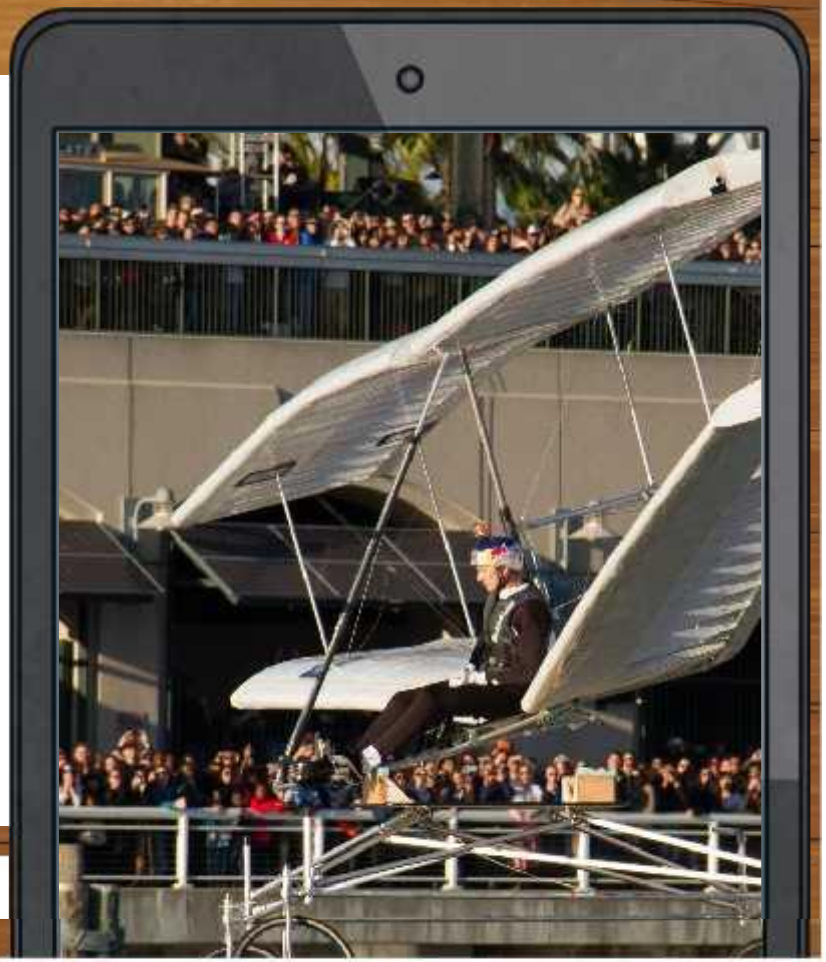
Spot the Mathematical Error



The regrouped ten has not been added to the total of 8 tens + 4 tens.

Flugtag

Flugtag is an event in which competitors attempt to fly their homemade human-powered flying machines. They must be powered by muscle, gravity and imagination only, made from environmentally friendly materials and be unsinkable. Flying machines and pilots must have a combined mass of less than 200kg and the maximum wingspan is 9 metres.



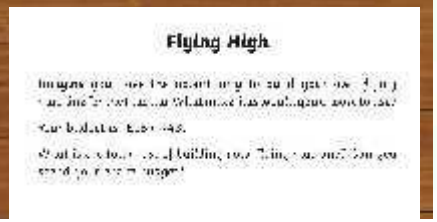
Flying High Activity

Imagine you have the opportunity to build your own flying machine for the Flugtag. **What materials would you choose to use?**

You will be given a budget.

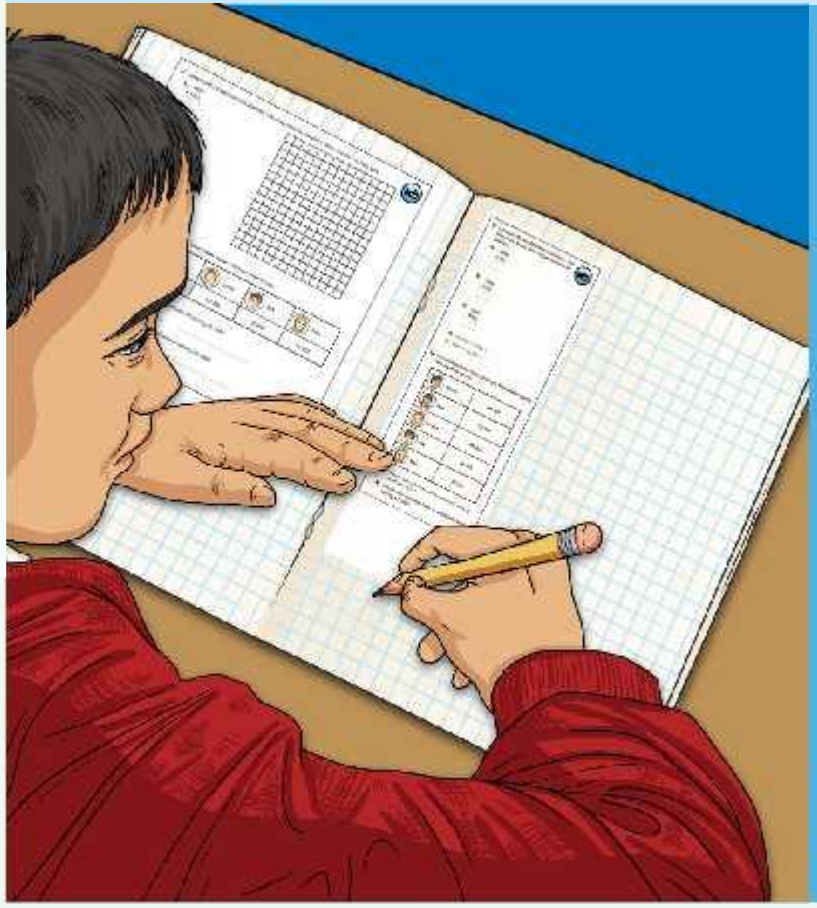
What is the total cost of building your flying machine?

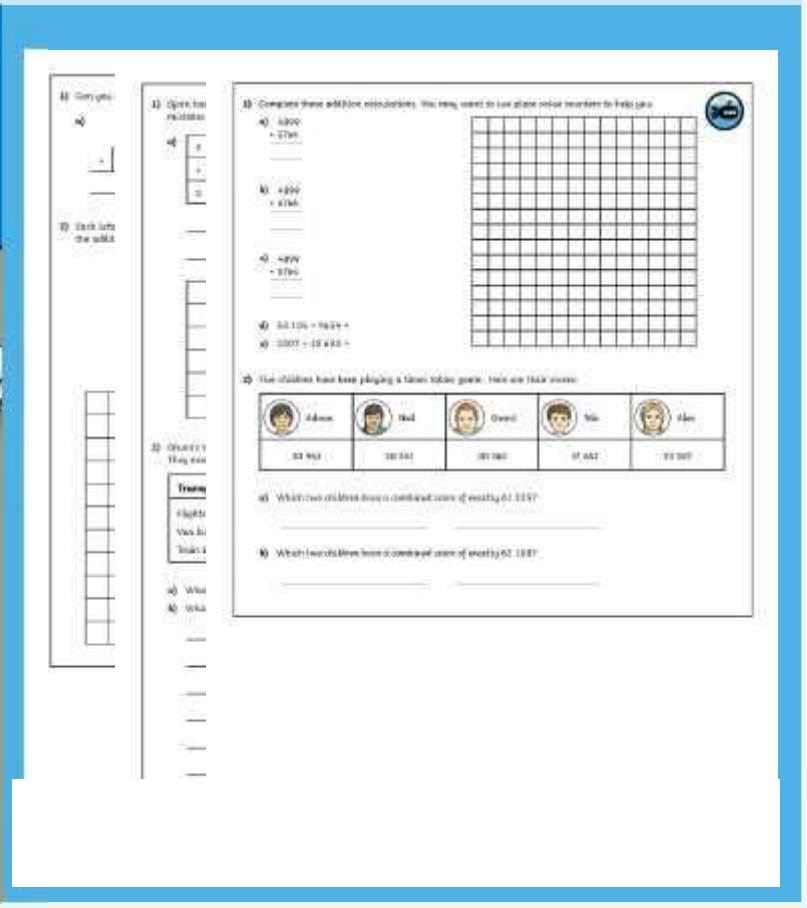
Can you spend every penny?



Diving into Mastery

Dive in by completing your own activity!



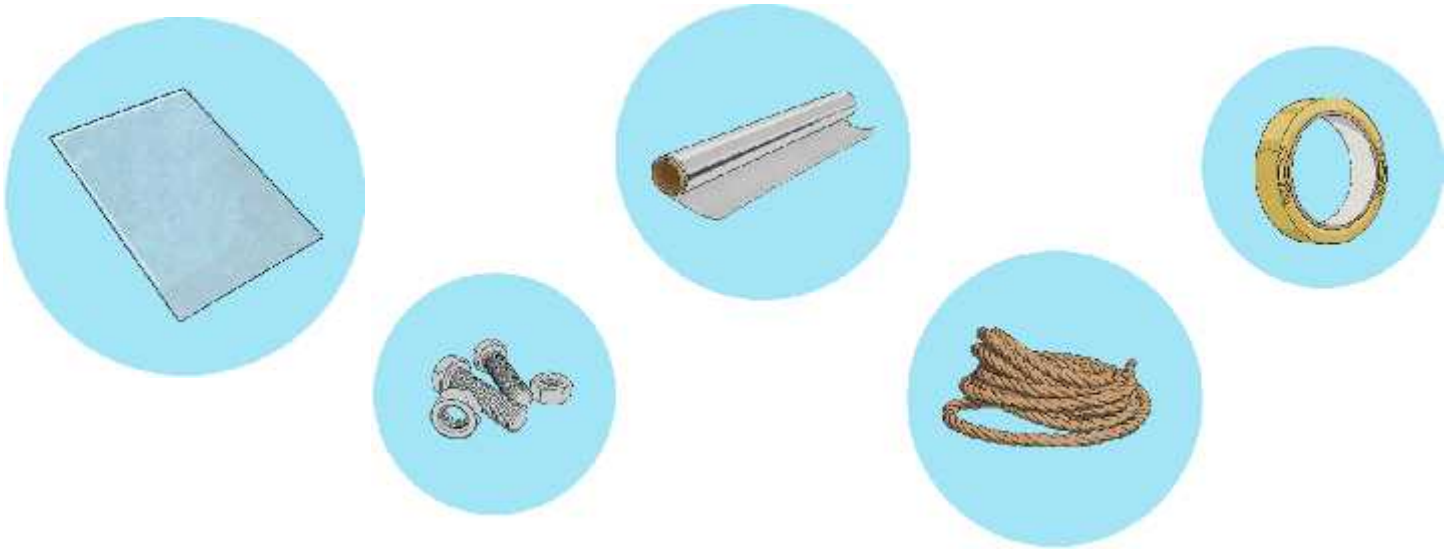


Take Off!

Which materials did you choose to spend your budget on?

How did you make sure that you stayed within your budget?

Did anyone manage to spend their budget exactly?



Checking Our Understanding

Can you identify the missing digits in these two calculations?

		5	5	**0**	3	9	
	+		**5**	6	5	**2**	
		6	0	6	9	1	
		1			**1**		

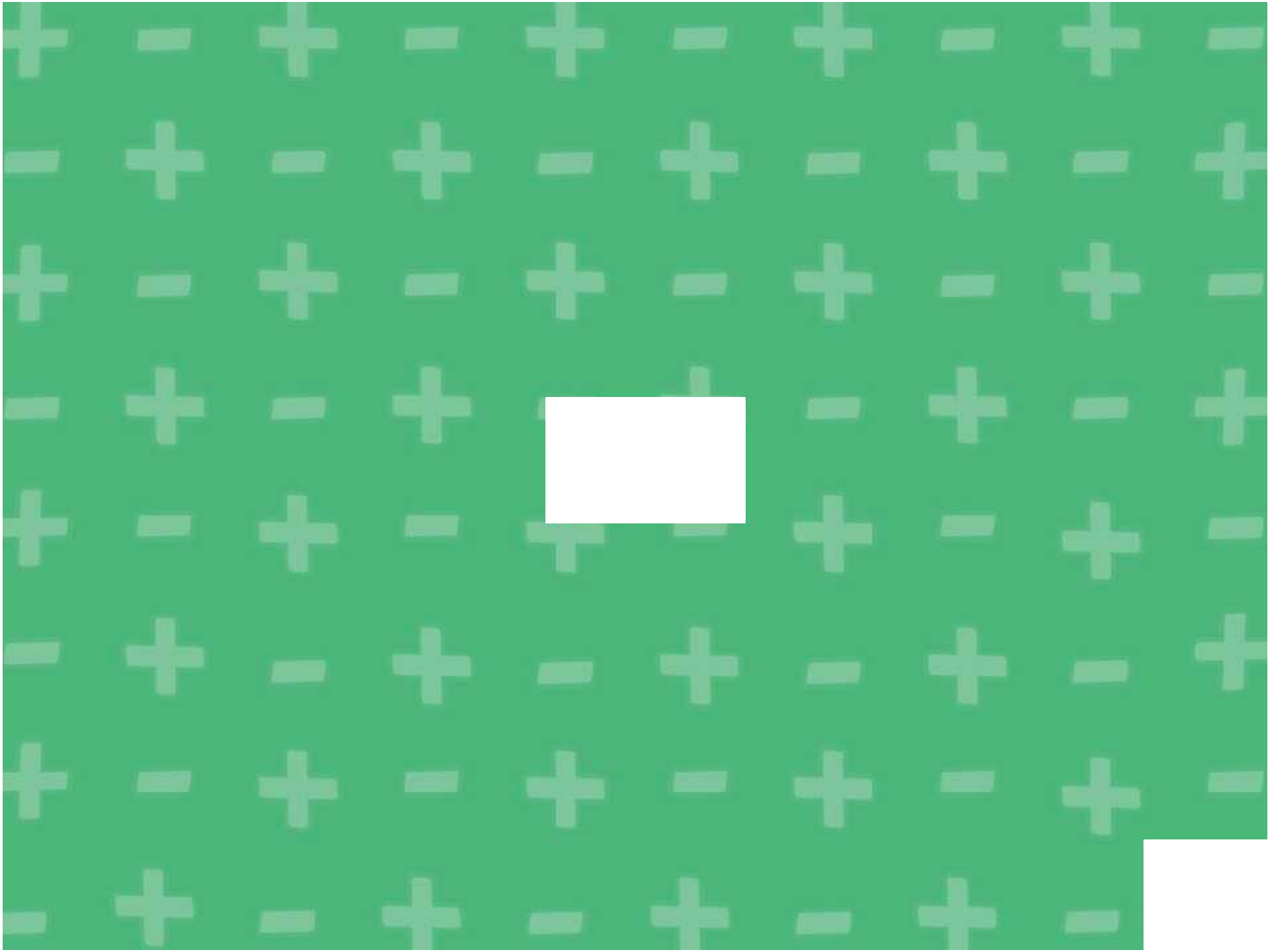
		2	**4**	3	0	2	
	+	3	5	**7**	**0**	4	
		6	0	0	0	6	
		1	**1**				

Aim

- To add numbers with up to 6 digits.

Success Criteria

- I can use a formal written method to add whole numbers with more than 4 digits.
- I can explain why regrouping is necessary in written calculations.
- I can regroup more than once when using formal written methods of addition.



Aim: To add numbers with up to 6 digits.				**Date:**					
				Delivered By:			**Support:**		
Success Criteria	**Me**	**Friend**	**Teacher**	**T**	**PPA**	**S**	**I**	**AL**	**GP**
I can use a formal written method to add whole numbers with more than 4 digits.				**Notes/Evidence**					
I can explain why regrouping is necessary in written calculations.									
I can regroup more than once when using formal written methods of addition.									

Next Steps

- _____
- _____

~~T~~	~~Teacher~~	~~I~~	~~Independent~~
PPA	Planning, Preparation and Assessment	**AL**	Adult Led
S	Supply	**GP**	Guided Practice

Aim: To add numbers with up to 6 digits.				**Date:**					
				Delivered By:			**Support:**		
Success Criteria	**Me**	**Friend**	**Teacher**	**T**	**PPA**	**S**	**I**	**AL**	**GP**
I can use a formal written method to add whole numbers with more than 4 digits.				**Notes/Evidence**					
I can explain why regrouping is necessary in written calculations.									
I can regroup more than once when using formal written methods of addition.									

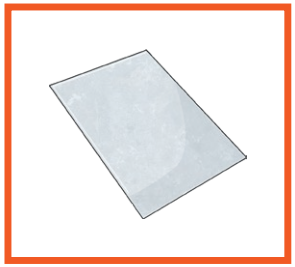
Next Steps

- _____
- _____

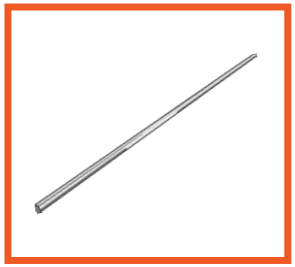
T	Teacher	**I**	Independent
PPA	Planning, Preparation and Assessment	**AL**	Adult Led
S	Supply	**GP**	Guided Practice

Flying Machines Materials Sheet

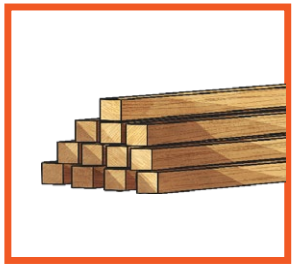
To add numbers with up to 6 digits.



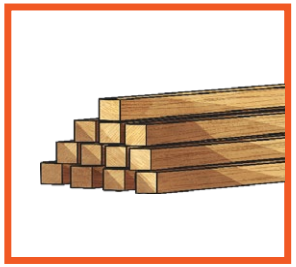
Plastic 100m
£3451



Steel Poles
£2844

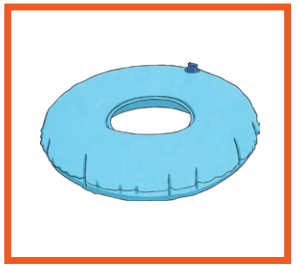


Wood 500m
£1912



Wood 1000m
£1095

Luxury Sewing Kit
£2710



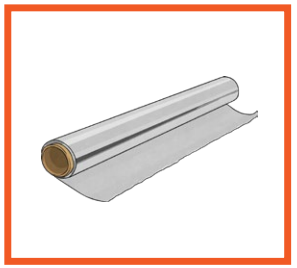
Rubber Rings
£1938

Wheels x 4
£3903

Puncture Repair Kit
£8493

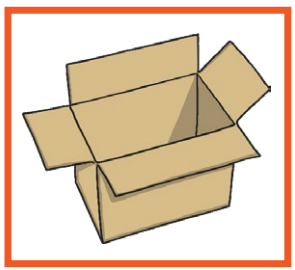
Bicycle Pedals
£1250

Rope 500m
£8190

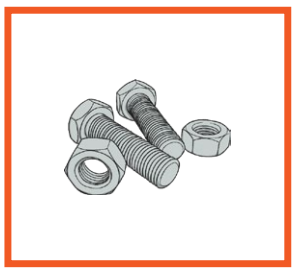


Tinfoil
£3072

Pack of white glue
£2839

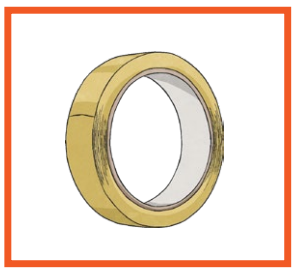


Cardboard 100m
£2717

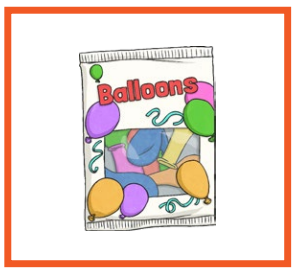


Nuts and Bolts
£1930

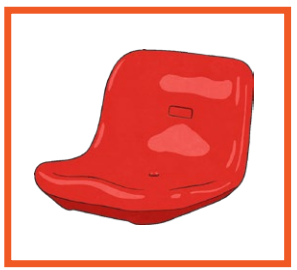
Fabric 550m
£1670



Tape
Free



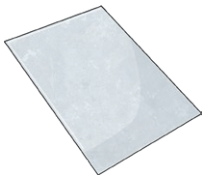
Pack of 5000 Balloons
£2837



Plastic Seats
£1038

Flying Machines Materials Sheet

To add numbers with up to 6 digits.



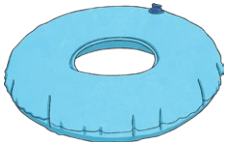
Plastic 100m
£31 451

Steel Poles
£22 844

Wood 500m
£14 912

Wood 1000m
£12 095

Luxury Sewing Kit
£24 710

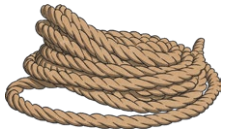


Rubber Rings
£11 938

Wheels x 4
£30 903

Puncture Repair Kit
£80 493

Bicycle Pedals
£11 250



Rope 500m
£80 190

Tinfoil
£31 072

Pack of white glue
£20 839

Cardboard 100m
£24 717

Nuts and Bolts
£16 930

Fabric 550m
£12 670

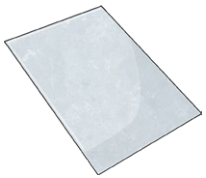
Tape
Free

Pack of 5000 Balloons
£21 837

Plastic Seats
£14 038

Flying Machines Materials Sheet

To add numbers with up to 6 digits.



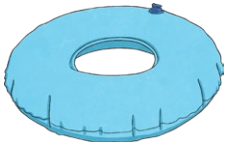
Plastic 100m
£31 499

Steel Poles
£120 899

Wood 500m
£110 988

Wood 1000m
£120 099

Luxury Sewing Kit
£24 999

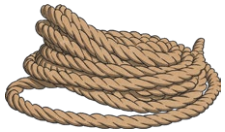


Rubber Rings
£11 988

Wheels x 4
£30 977

Puncture Repair Kit
£80 499

Bicycle Pedals
£110 299



Rope 500m
£80 188

Tinfoil
£31 066

Pack of white glue
£20 877

Cardboard 100m
£101 766

Nuts and Bolts
£106 999

Fabric 550m
£12 699

Tape
Free

Pack of 5000 Balloons
£21 899

Plastic Seats
£114 078

1) a) 10 663
b) 16 345
c) 45 200
d) 67 839
e) 42 460

2) Adnan and Grant

3) Nell and Nik

1) a) Bjorn should have regrouped 10 ones into one ten, adding it to the 9 tens he added together in the second column. Additionally, the 1 hundred regrouped from the tens column should be added to 500 + 600 + 100 = 1200. Finally, the regrouped 1000 should be added to 2000 + 3000 + 1000 = 6000. The final answer should be 36 201.

b) Bjorn has not lined the digits up in the correct place value columns. The value of the 2 is two thousands but he has put it in the ten thousands column. The final answer should be 54 528.

2) a) Flights and hotel = £39 998
Flights and apartment = £44 999
Flights and chalet = £37 866

Van travel and hotel = £34 974
Van travel and apartment = £39 975
Van travel and chalet = £32 842

Train and hotel = £42 699
Train and apartment = £47 700
Train and chalet = £40 567

b) Answers will vary.
For the sums that include adding £30 000, some children may have calculated mentally.
For the sums that include adding numbers ending in £999, some children may have calculated this mentally, by rounding to the nearest thousand, then adjusting their answer.

1) a)

	4	9	**0**	5	**7**
+	**3**	9	5	**9**	1
	8	8	6	4	8
	1		1		

b)

	5	**5**	7	1	9
+	1	4	**9**	7	**9**
	7	0	6	**9**	8
	1	1		1	

2) 6125 + 3715 = 9840
2175 + 6315 = 8490

1) Complete these addition calculations. You may want to use place value counters to help you.

a) 4899
+ 5764
_____

b) 9654
+ 6691
_____

c) 38521
+ 6679
_____

d) 58 185 + 9654 =

e) 3807 + 38 653 =

2) Five children have been playing a times tables game. Here are their scores:

 Adnan	 Nell	 Grant	 Nik	 Alex
30 963	30 541	30 362	31 647	33 587

a) Which two children have a combined score of exactly 61 325?

_____ _____

b) Which two children have a combined score of exactly 62 188?

_____ _____

1) Bjorn has been practising his column method but he has made some mistakes. Can you identify all the mistakes and explain his errors? Then, carry out the sum yourself to find the correct total.

a)

3	2	5	2	5
+	3	6	7	6
3	5	1	9	1

b)

	2	9	1	7	
+	5	1	6	1	1
	7	0	7	8	1

2) Bruno's team are trying to work out how much their trip to Flugtag might cost.
They need to book one method of transport and one type of accommodation.

Transport	**Accommodation**
Flights £14 999	Hotel £24 999
Van hire, ferry & petrol £9975	Apartment £30 000
Train £17 700	Chalet £22 867

a) What prices would the different combinations cost them?

b) Which totals did you need to use column addition for, and what other methods could you use?

1) Can you identify the missing digits in these two calculations?

a)

	4	9		5	
+		9	5		1
	8	8	6	4	8
	1		1		

b)

			7	1	9
+	1	4		7	
	7	0	6		8
	1	1		1	

2) Each letter represents a different number between 0 and 9. Can you work out what the letters represent to make the addition calculation work? Can you find more than one solution?

	B	**L**	**U**	**E**
+	**T**	**A**	**L**	**E**
	P	**I**	**N**	**K**

L

1) Complete these addition calculations. You may want to use place value counters to help you.

a)
$$\begin{array}{r} 4899 \\ +\ 5764 \\ \hline \\ \hline \end{array}$$

b)
$$\begin{array}{r} 9654 \\ +\ 6691 \\ \hline \\ \hline \end{array}$$

c)
$$\begin{array}{r} 38521 \\ +\ 6679 \\ \hline \\ \hline \end{array}$$

d) 58 185 + 9654 =

e) 3807 + 38 653 =

2) Five children have been playing a times tables game. Here are their scores:

 Adnan	30 963
 Nell	30 541
 Grant	30 362
 Nik	31 647
 Alex	33 587

a) Which two children have a combined score of exactly 61 325?

b) Which two children have a combined score of exactly 62 188?

1) Complete these addition calculations. You may want to use place value counters to help you.

a)
$$\begin{array}{r} 4899 \\ +\ 5764 \\ \hline \\ \hline \end{array}$$

b)
$$\begin{array}{r} 9654 \\ +\ 6691 \\ \hline \\ \hline \end{array}$$

c)
$$\begin{array}{r} 38521 \\ +\ 6679 \\ \hline \\ \hline \end{array}$$

d) 58 185 + 9654 =

e) 3807 + 38 653 =

2) Five children have been playing a times tables game. Here are their scores:

Adnan	30 963
Nell	30 541
Grant	30 362
Nik	31 647
Alex	33 587

a) Which two children have a combined score of exactly 61 325?

b) Which two children have a combined score of exactly 62 188?

1) Bjorn has been practising his column method but he has made some mistakes. Can you identify all the mistakes and explain his errors? Then, carry out the sum yourself to find the correct total.

a)

3	2	5	2	5
+	3	6	7	6
3	5	1	9	1

b)

	2	9	1	7	
+	5	1	6	1	1
	7	0	7	8	1

2) Bruno's team are trying to work out how much their trip to Flugtag might cost.
They need to book one method of travel and one type of accommodation.

Transport	**Accommodation**
Flights £14 999	Hotel £24 999
Van hire, ferry & petrol £9975	Apartment £30 000
Train £17 700	Chalet £22 867

a) What prices would the different combinations cost them?

b) Which totals did you need to use column addition for, and what other methods could you use?

1) Bjorn has been practising his column method but he has made some mistakes. Can you identify all the mistakes and explain his errors? Then, carry out the sum yourself to find the correct total.

a)

3	2	5	2	5
+	3	6	7	6
3	5	1	9	1

b)

	2	9	1	7	
+	5	1	6	1	1
	7	0	7	8	1

2) Bruno's team are trying to work out how much their trip to Flugtag might cost.
They need to book one method of travel and one type of accommodation.

Transport	**Accommodation**
Flights £14 999	Hotel £24 999
Van hire, ferry & petrol £9975	Apartment £30 000
Train £17 700	Chalet £22 867

a) What prices would the different combinations cost them?

b) Which totals did you need to use column addition for, and what other methods could you use?

1) Can you identify the missing digits in these two calculations?

a)

	4	9	□	5	□
+	□	9	5	□	1
	8	8	6	4	8
	1		1		

b)

	□	□	7	1	9
+	1	4	□	7	□
	7	0	6	□	8
	1	1		1	

2) Each letter represents a different number between 0 and 9. Can you work out what the letters represent to make the addition calculation work? Can you find more than one solution?

	B	**L**	**U**	**E**
+	**T**	**A**	**L**	**E**
	P	**I**	**N**	**K**

L

1) Can you identify the missing digits in these two calculations?

a)

	4	9	□	5	□
+	□	9	5	□	1
	8	8	6	4	8
	1		1		

b)

	□	□	7	1	9
+	1	4	□	7	□
	7	0	6	□	8
	1	1		1	

2) Each letter represents a different number between 0 and 9. Can you work out what the letters represent to make the addition calculation work? Can you find more than one solution?

	B	**L**	**U**	**E**
+	**T**	**A**	**L**	**E**
	P	**I**	**N**	**K**

L

Flying High

Imagine you have the opportunity to build your own flying machine for the Flugtag. What materials would you choose to use?

Your budget is £15 701.

What is the total cost of building your flying machine? Can you spend your entire budget?

Flying High

Imagine you have the opportunity to build your own flying machine for the Flugtag. What materials would you choose to use?

Your budget is £15 701.

What is the total cost of building your flying machine? Can you spend your entire budget?

Flying High

Imagine you have the opportunity to build your own flying machine for the Flugtag. What materials would you choose to use?

Your budget is £15 701.

What is the total cost of building your flying machine? Can you spend your entire budget?

twinkl planit ★ **Maths** | Addition and Subtraction | Add and Subtract Numbers | Lesson 3 of 7: Add Whole Numbers with More than 4 Digits

Flying High

Imagine you have the opportunity to build your own flying machine for the Flugtag. What materials would you choose to use?

Your budget is £157 943.

What is the total cost of building your flying machine? Can you spend your entire budget?

Flying High

Imagine you have the opportunity to build your own flying machine for the Flugtag. What materials would you choose to use?

Your budget is £157 943.

What is the total cost of building your flying machine? Can you spend your entire budget?

Flying High

Imagine you have the opportunity to build your own flying machine for the Flugtag. What materials would you choose to use?

Your budget is £157 943.

What is the total cost of building your flying machine? Can you spend your entire budget?

twinkl planit ★★

Maths | Year 5 | Addition and Subtraction | Add and Subtract Numbers | Lesson 3 of 7: Add Whole Numbers with More than 4 Digits

twinkl Quality Standard Approved

Flying High

Imagine you have the opportunity to build your own flying machine for the Flugtag. What materials would you choose to use?

Your budget is £133 128.

What is the total cost of building your flying machine? Can you spend your entire budget?

Flying High

Imagine you have the opportunity to build your own flying machine for the Flugtag. What materials would you choose to use?

Your budget is £133 128.

What is the total cost of building your flying machine? Can you spend your entire budget?

Flying High

Imagine you have the opportunity to build your own flying machine for the Flugtag. What materials would you choose to use?

Your budget is £133 128.

What is the total cost of building your flying machine? Can you spend your entire budget?

Flying High

Imagine you have the opportunity to build your own flying machine for the Flugtag. What materials would you choose to use?

Your budget is £133 128.

What is the total cost of building your flying machine? Can you spend your entire budget?

Flying High Answers

★

In order to spend their entire budget, children could spend £15 701 on rubber rings, wheels, 500m of rope and some fabric.

★★

In order to spend their entire budget of £157 943, children could buy wheels, a luxury sewing kit, balloons and a puncture repair kit.

★★★

In order to spend their entire budget of £133 128, children could buy rubber rings, plastic, a luxury sewing kit, tinfoil, white glue and some fabric.

Addition and Subtraction | Add Whole Numbers with More than 4 Digits

To add numbers with up to 6 digits.		
I can use a formal written method to add whole numbers with more than 4 digits.		
I can explain why regrouping is necessary in written calculations.		
I can regroup more than once when using formal written methods of addition.		

Addition and Subtraction | Add Whole Numbers with More than 4 Digits

To add numbers with up to 6 digits.		
I can use a formal written method to add whole numbers with more than 4 digits.		
I can explain why regrouping is necessary in written calculations.		
I can regroup more than once when using formal written methods of addition.		

Addition and Subtraction | Add Whole Numbers with More than 4 Digits

To add numbers with up to 6 digits.		
I can use a formal written method to add whole numbers with more than 4 digits.		
I can explain why regrouping is necessary in written calculations.		
I can regroup more than once when using formal written methods of addition.		

Addition and Subtraction | Add Whole Numbers with More than 4 Digits

To add numbers with up to 6 digits.		
I can use a formal written method to add whole numbers with more than 4 digits.		
I can explain why regrouping is necessary in written calculations.		
I can regroup more than once when using formal written methods of addition.		

Addition and Subtraction | Add Whole Numbers with More than 4 Digits

To add numbers with up to 6 digits.		
I can use a formal written method to add whole numbers with more than 4 digits.		
I can explain why regrouping is necessary in written calculations.		
I can regroup more than once when using formal written methods of addition.		

Addition and Subtraction | Add Whole Numbers with More than 4 Digits

To add numbers with up to 6 digits.		
I can use a formal written method to add whole numbers with more than 4 digits.		
I can explain why regrouping is necessary in written calculations.		
I can regroup more than once when using formal written methods of addition.		

Addition and Subtraction | Add Whole Numbers with More than 4 Digits

To add numbers with up to 6 digits.		
I can use a formal written method to add whole numbers with more than 4 digits.		
I can explain why regrouping is necessary in written calculations.		
I can regroup more than once when using formal written methods of addition.		

Addition and Subtraction | Add Whole Numbers with More than 4 Digits

To add numbers with up to 6 digits.		
I can use a formal written method to add whole numbers with more than 4 digits.		
I can explain why regrouping is necessary in written calculations.		
I can regroup more than once when using formal written methods of addition.		