<u>Reasoning and Problem Solving</u> <u>Step 5: Adding – Same Decimal Places</u>

National Curriculum Objectives:

Mathematics Year 5: (5F10) <u>Solve problems involving number up to 3dp</u>. Mathematics Year 5: (5M9a) <u>Use all four operations to solve problems involving measure</u> [for example, length, mass, volume, money] using decimal notation, including scaling.

Differentiation:

Questions 1, 4, 7 (Problem Solving)

Developing Calculate the highest amount, adding 2 numbers with same decimal places involving tenths and hundredths, from a choice of amounts. Minimal exchanges. Expected Calculate the highest amount, adding 3 numbers with same decimal places involving ones, tenths and hundredths, from a choice of amounts. Some exchanges. Greater Depth Calculate the highest amount, adding 4 numbers with same decimal places involving tens, ones, tenths and hundredths, from a choice of amounts. Multiple exchanges.

Questions 2, 5, 8 (Problem Solving)

Developing Move across a number grid of 5x5, calculating the compound sum as you go. Numbers include tenths and hundredths and the aim is to create the lowest sum. Expected Move across a number grid of 7x7, calculating the compound sum as you go. Numbers include ones, tenths and hundredths and the aim is to create the lowest sum. Greater Depth Move across a number grid of 8x8, calculating the compound sum as you go. Numbers include tens, ones, tenths and hundredths and the aim is to create the lowest sum. go. Numbers include tens, ones, tenths and hundredths and the aim is to create the lowest sum.

Questions 3, 6, 9 (Reasoning)

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Developing Consider 3 additions of numbers including tenths and hundredths. Order the calculations from easiest to hardest giving reasoning for the position of each. Expected Consider 4 additions of numbers including ones, tenths and hundredths. Order the calculations from easiest to hardest giving reasoning for the position of each. Greater Depth Consider 4 additions of numbers including tens, ones, tenths and hundredths. Order the numbers including tens, ones, tenths and hundredths. Order the calculations from easiest to hardest giving reasoning for the position of each.

More <u>Year 5 Decimals</u> resources.

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Reasoning and Problem Solving – Adding – Same Decimal Places – Teaching Information

<u>Adding</u>	<u> Adding – Same Decimal Places</u>						Adding	<u>– Sai</u>	me D	ecin	nal P	lace	<u>•S</u>
1a. Johnny pocket mo	's par ney li	ents h st for h	ave so nim.	et up (a		1b. Kelly's parents have set up a pocket money list for her.						
Was Dish Vac Bedi Gard	Wash up £0.40 Dishwasher £0.50 Vacuuming £0.45 Bedroom £0.30 Gardening £0.40					Wash up £0.25 Dishwasher £0.35 Vacuuming £0.45 Bedroom £0.35 Gardening £0.45							
He has time to do 2 jobs. What is the most money he can earn?					She has tim What is the	She has time to do 2 jobs. What is the most money she can earn?							
PS PS					合						PS		
2a. Move across the grid from left to right adding each number as you go. The aim is to end with the smallest number possible. You are not allowed to move diagonally!					2a. Move a adding eac The aim is t number po You are not o	cross ch nur o end ssible allowe	the gr nber (with l d to mo	rid froi as you the sm ove dia	m left 9 go. 1allest 2gonal	to righ	it		
	0.25	0.05	0.38	0.01	0.06			0.04	0.03	0.5	0.02	0.04	
Start →	0.12	0.51	0.34	0.45	0.14			0.26	0.11	0.1	0.09	0.07	
	0.5	0.05	0.18	0.03	0.03			0.15	0.17	0.01	0.08	0.2	
	0.02	0.55	0.92	0.51	0.74		Start →	0.4	0.13	0.2	0.18	0.24	
	0.62	0.02	0.62	0.03	0.04	PS	合	0.06	0.13	0.12	0.04	0.01	PS
3a. Order e to the tricki	each c iest to	additic solve	on fror	n the	easies	st	3b. Order e to the tricki	ach c est to	additic solve	on fron	n the o	easies	t
	0.	15 +	0.15					0.	.36 +	0.3			
	0.	49 +	0.29					0.	91 +	0.09			
0.21 + 0.21						0.	06 +	0.23					
Explain you	Explain your choices.					Explain your choices.							
R R					合						R		

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Reasoning and Problem Solving – Adding – Same Decimal Places – Year 5 Developing

<u>Ado</u>	Adding – Same Decimal Places							<u>s</u>	Adding – Same Decimal Places								
4a. B mone	essie' ey list	's par for h	rents er.	have	set u	pap	ocke	et	4b. G mone	eoff's ey list	s pare for hi	ents h m.	ave s	set up	o a po	ocket	I
	Nash Dishw /acu Bedro Garde	up ashe uming oom ening	£1.2 r £0.3 g £1.6 £2.5 (£6.7	3 57 57 72		•	-			Vash Dishwo Vacuu edroo Garde	up asher uming om ening	£0.95 £0.75 £4.6 £2.93 £7.2	5 5 5 8 5		0		
She has time to do 3 jobs. What is the most money she can earn?					He ho What	as tim is the	e to d e mos	do 3 j t moi	obs. ney h	e cai	n ear	n?					
企	PS PS						PS	企								PS	
5a. Move across the grid from left to right adding each number as you go. The aim is to end with the smallest number possible. You are not allowed to move diagonally!						5a. M addir The a numt You a	love o ng ea im is per po re not	acros ch nu to en ossibl allow	s the umbe d wit e. ed to	grid f er as y h the move	irom l vou g smal diago	eft to o. lest onally!	right				
	1.23	2.03	1.42	3.01	6.95	4.03	9.96			1.21	2.45	5.43	2.04	1. 02	0.92	1.02	
Start	1.41	5.34	3.05	5.87	3.75	5.82	9.03			1.41	3.64	4.32	3.98	4.03	3.09	5.53	
	4.31	3.45	1.99	4.89	7.35	5.35	1.03			4.31	3.97	3.01	2.04	0.93	2.03	2.3	
	4.45	9.97	2.58	0.23	1.02	4.07	2.45		Start	2.42	2.01	2.96	2.15	1.73	1.04	4.08	
	1.01	5.1	0.94	3.89	0.01	3.96	2.31			6.03	1.02	0.91	1.02	4.98	0.08	3.04	
\sim	2.04	2.09	3.65	2.79	2.09	5.92	1.41		\sim	2.03	3.02	2.33	1.99	5.32	1.24	1.32	
6a. O to the	order e trick	each ciest t	addi o solv	ition f ve.	rom t	he eo	asiest	PS	6b. O to the	rder (trick	each iest t	addi o solv	tion fi /e.	rom t	he ec	Isiest	PS
			9.17	+ 0.9	7						4	1.44	+ 2.2	2			
			0.05	+ 4.2	25						().33	+ 0.7	7			
	2.65 + 9.65										().09	+ 1.1	1			
	4.12 + 1.24							4.32 + 6.78									
Expla	xplain your choices.						Explain your choices.										
合								R	合								R

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Reasoning and Problem Solving – Adding – Same Decimal Places – Year 5 Expected

<u>Adding – Same Decimal Places</u>						Adding – Same Decimal Places													
7a. mo	Roby ney l	yn's list fo	pareı r her	nts ho	ave s	et up	o a p	ocke	et	7b. mo	Josh ney l	's pc ist fo	arent: or him	s hav 1.	e set	up c	a poc	:ket	
	Wo Dis Vo Be Go	ash u shwa acuu edroc arde	ip Isher ming om ning	£1.69 £0.6 £3.1 £6.53 £7.9) 7 5 3 5	*	· ·				Wo Dis Vo Be Go	ash u hwa icuui droo irder	p sher ming m hing	£2.35 £1.7 £3.1 £7.50 £7.2	5				
She Wh	e has at is f	time the n	to d nost i	o 4 jo mone	obs. ey sh	e ca	n ea	rn?		He Wh	has t at is t	ime the n	to do nost i	o 4 jo mone	bs. ey he	can	earr	ו?	
PS					PS										PS				
8a. Move across the grid from left to right adding each number as you go. The aim is to end with the smallest number possible. You are not allowed to move diagonally!						t	8a. ada The nur You	Mov ding aim nber are no	e ac eact is to poss ot allov	ross n nun end sible. ved to	the g nber with ^{move}	rid fro as yc the s diago	om le ou go malle nally!	eft to). est	right	1			
	10.32	10.34	20.45	12.01	2.13	5.76	5.01	5.14			0.13	5.93	16.65	12.31	41.23	1.75	8.04	11.34	
	13.01	10.98	20.62	12.02	3.12	5.67	2.02	5.13		Start	0.33	0.05	14.42	12.56	47.12	1.97	2.95	11.43	
	14.36	10.32	20.78	13.03	1.23	4.87	0.04	5.15			0.03	0.43	15.81	13.89	43.67	1.87	5.86	21.23	
	13.46	10.45	20.23	10.99	4.32	6.57	2.11	2.17			1.04	0.05	14.33	11.19	41.21	1.18	6.57	21.16	
	15.23	10.34	20.87	12.13	2.12	6.75	5.12	5.16			0.92	2.94	11.89	11.13	39.12	1.65	7.46	11.17	
Start	11.45	10.43	20.88	13.12	14.35	6.78	5.33	5.12	ļ		0.05	0.73	11.19	11.29	37.65	1.18	9.3	21.18	
	15.43	10.34	21.02	12.13	4.21	0.09	6.01	5.14	ļ		0.50	0.74	11.36	11.32	35.91	4.29	10.24	11.18	
SP	14.44	10.91	20.11	14.21	4.33	6.79	5.43	5.62	PS	Q	0.89	0.81	12.01	11.21	34.83	1.11	9.13	21.63	PS
9a. to t	Orde he tri	er ea ickie	ch a st to	dditi solve	on fro e.	om th	ne ec	isiest	ł	9b. to t	Orde he tri	er ea ckie	ich a st to	dditi solve	on fro e.	om th	ie ea	siest	
			46.	75 +	77.8	36							20.	91 +	99.9	9			
			9.	01 +	0.99	7							83.	21 +	10.4	6			
	58.73 + 50.07									92	.37 +	- 7.6	3						
	22.33 + 33.22						9.89 + 0.11												
Exp	Explain your choices.						Explain your choices.												
									R	會									R

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Reasoning and Problem Solving – Adding – Same Decimal Places – Year 5 Greater Depth

Reasoning and Problem Solving Adding – Same Decimal Places

Developing

1a. $\pounds 0.50 + \pounds 0.45 = \pounds 0.95$

2a. 0.87

	0.25	0.05	0.38	0.01	0.06
Start →	0.12	0.51	0.34	0.45	0.14
	0.5	0.05	0.18	0.03	0.03
	0.02	0.55	0.92	0.51	0.74
	0.62	0.02	0.62	0.03	0.04

Children's answers below may vary but should show consideration of exchanges, known facts such as bonds and complements.

3a.		1 because it has no
2	0.15 + 0.15	exchanges and easily known sums.
3	0.49 + 0.29	2 as although there is an exchange it is a known fact
1	0.21 + 0.21	0.05 + 0.05 = 0.1. 3 as there is one exchange

but also a more difficult sum.

Expected

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4a. £1.67 + £2.55 + £6.72 = £10.94 5a. 21.24

	1.23	2.03	1.42	3.01	6.95	4.03	9.96
Start	1.41	2.54	3.05	5.87	3.75	5.82	9.03
	2.31	2.45	1.99	4.89	7.35	5.35	1.03
	4.45	9.97	2.58	0.23	1.02	4.07	2.45
	1.01	5.1	0.94	3.89	0.01	3.96	2.31
	2.04	2.09	3.65	2.79	2.09	5.92	1.41
	8.96	9.01	2.4	3.00	3.02	3.94	1.23

Children's answers below may vary but should show consideration of exchanges, known facts such as bonds and complements. 6a.

4	9.17 + 0.97	1 because there is only one exchange and only one digit to add.	
1	0.05 + 4.25	2 as there are no exchanges, but more digits to add.	
3	2.65 + 9.65	3 as there are 3 exchanges to complete the calculation.	1
2	4.12 + 1.24	4 because there are 3 exchanges, one of which crosses the decimal and the tens column is needed.	•

<u>Reasoning and Problem Solving</u> <u>Adding – Same Decimal Places</u>

Developing

1b. $\pounds 0.45 + \pounds 0.45 = \pounds 0.90$

2b. 0.99

. 0.77	0.04	0.03	0.5	0.02	0.04
	0.26	0.11	0.1	0.09	0.07
	0.15	0.17	0.01	0.08	0.2
Start 🗕	0.4	0.13	0.2	0.18	0.24
	0.06	0.13	0.12	0.04	0.01

Children's answers below may vary but should show consideration of exchanges, known facts such as bonds and complements. 3b.

55.		1 because it has no
2	0.36 + 0.3	exchanges and easily known sums.
3	0.91 + 0.09	2 as it requires knowledge of 0 as a place holder in the hundredths column.
1	0.06 + 0.23	3 as the exchange will take the number past the decimal
Expe	<u>ected</u>	point into the ones.

4b. £2.93 + £4.65 + £7.25 = £14.83 5b. 14.94

	1.21	2.45	5.43	2.04	1.02	0.92	1.02
	1.41	3.64	4.32	3.98	4.03	3.09	5.53
	4.31	3.97	3.01	2.04	0.93	2.03	2.3
Start	2.42	2.01	2.96	2.15	1.73	1.04	4.08
	6.03	1.02	0.91	1.02	4.98	0.08	3.04
	2.03	3.02	2.33	1.99	5.32	1.24	1.32
	7.93	1.03	3.12	4.29	0.74	4.01	0.91

Children's answers below may vary but should show consideration of exchanges, known facts such as bonds and complements. 6b.

1 because there are no 1 4.44 + 2.22exchanges and easy additions. 2 as there is one exchange with 0.33 + 0.773 an easy addition. 3 as there are 2 exchanges but they are similar calculations for 2 0.09 + 1.11each. 4 is the most complex because 4 4.32 + 6.78

although they are all number bonds, they all impact on each other through exchanges.

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Reasoning and Problem Solving – Adding – Same Decimal Places ANSWERS

<u>Reasoning and Problem Solving</u> Adding – Same Decimal Places

Greater Depth

7a. £1.69 + £3.15 + £6.53 + £7.95 = £19.32 8a. 83.08

	10.32	10.34	20.45	12.01	2.13	5.76	5.01	5.14
	13.01	10.98	20.62	12.02	3.12	5.67	2.02	5.13
	14.36	10.32	20.78	13.03	1.23	5.87	0.04	5.15
	13.46	10.45	20.23	10.99	4.32	6.57	2.11	2.17
	15.23	10.34	20.87	12.13	2.12	6.75	5.12	5.16
Start	11.45	10.43	20.88	13.12	4.35	6.78	5.33	5.12
	15.43	10.34	21.02	12.13	4.21	0.09	6.01	5.14
	14.44	10.91	20.11	14.21	4.33	6.79	5.43	5.62

Children's answers below may vary but should show consideration of exchanges, known facts such as bonds and complements.

9a.
4 46.75 + 77.86
2 9.01 + 0.99
3 58.73 + 50.07
1 22.33 + 33.22
1 because there are no exchanges and the calculation is the same for each digit.
2 as the decimal places are a complement to 1 making the addition easier.
3 as 50.07 can be partitioned into 50 and 0.07.
1 22.33 + 33.22
4 is the most complex, all the digits require exchanges and the additions are not known

facts. The hundreds column will

also need to be used.

<u>Reasoning and Problem Solving</u> <u>Adding – Same Decimal Places</u>

<u>Greater Depth</u>

7b. £2.35 + £3.15 + £7.50 + £7.25 = £20.25 8b. 90.86

	0.13	5.93	16.65	12.31	31.23	1.75	8.04	11.34
Start	0.33	0.05	14.32	12.56	37.12	1.47	2.95	11.43
	0.03	0.43	15.81	13.89	33.67	1.87	5.86	21.23
	1.04	0.05	14.33	11.19	31.21	1.18	6.57	21.16
	0.92	2.94	11.89	11.13	39.12	1.65	7.46	11.17
	0.05	0.73	11.19	11.29	37.65	1.18	9.3	11.18
	0.50	0.74	11.36	11.32	33.91	1.29	9.24	11.18
	0.89	0.81	12.01	11.21	34.83	1.11	9.13	21.63

Children's answers below may vary but should show consideration of exchanges, known facts such as bonds and complements. 9b.

4	20.91 + 99.99	 because there are no exchanges. as the numbers are a complement to 1 making the addition easier. the decimal places are complements to 1 but a lesser known one. the most complex, all the digits require exchanges which results in the number going past 100.
1	83.21 + 10.46	
3	92.37 + 7.63	
2	9.89 + 0.11	



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Reasoning and Problem Solving – Adding – Same Decimal Places ANSWERS