



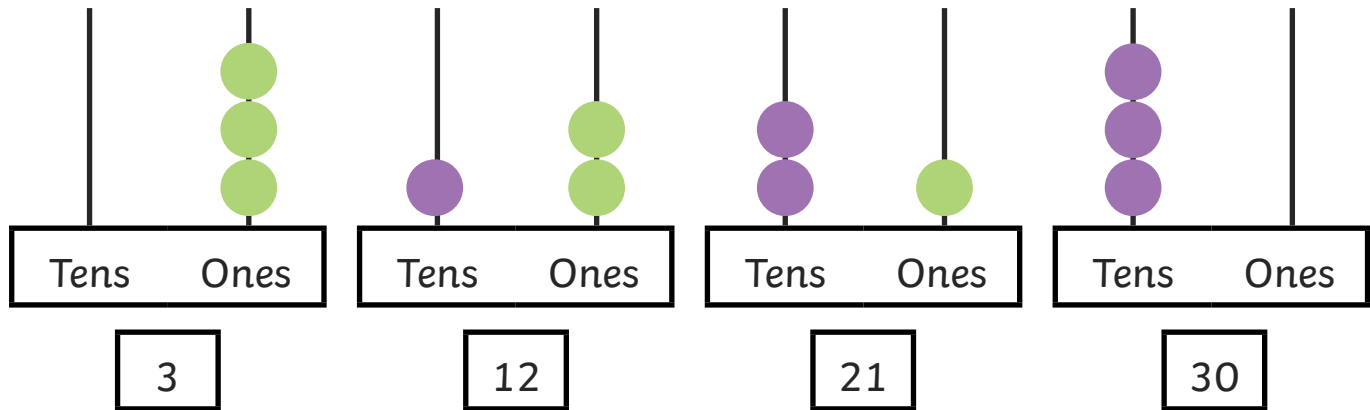
Winning Problems

I can use place value and number facts to solve problems.

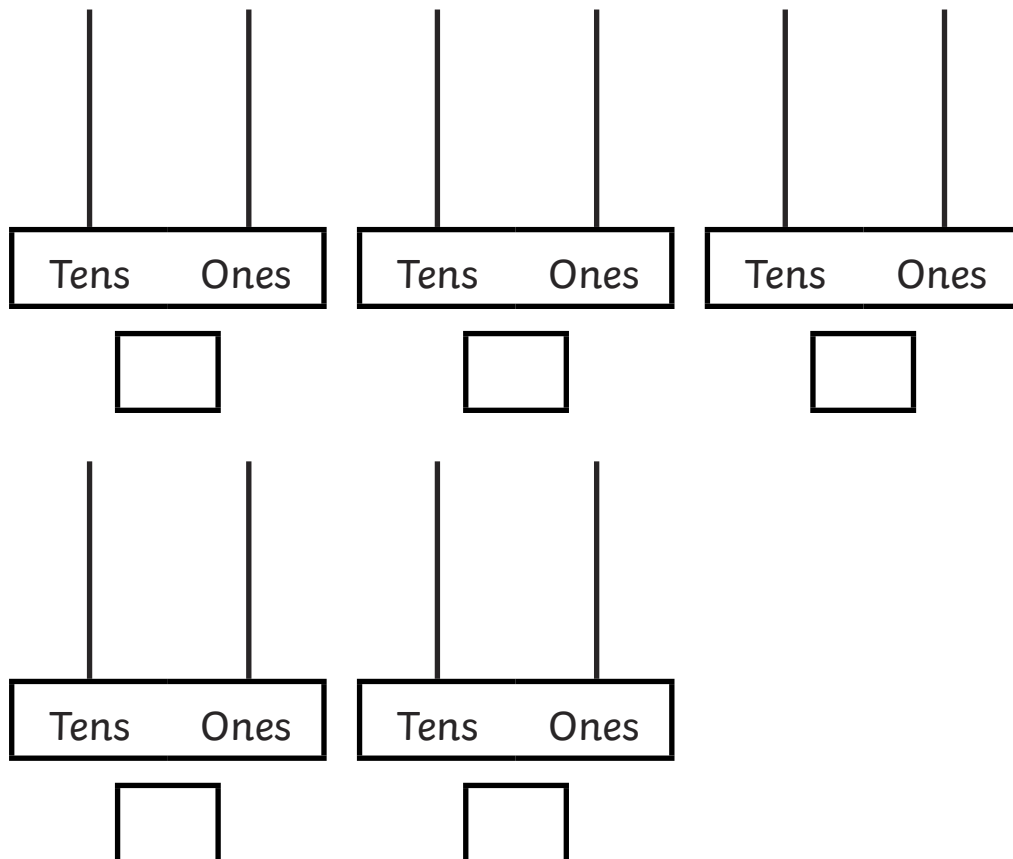


Tia says, "There are 3 beads on my abacus."

Team Twinkl might have 3 points, 12 points, 21 points, or 30 points.



1. Harry says, "There are 4 beads on my abacus."
How many points might the Happy Heroes have?

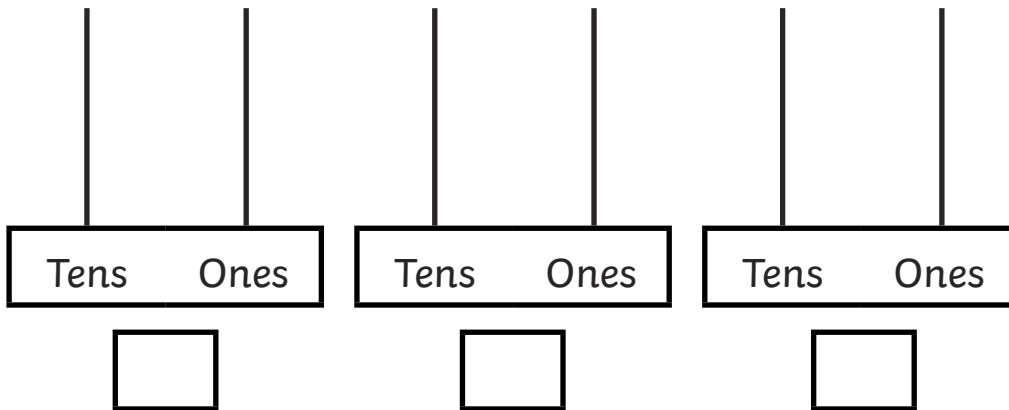
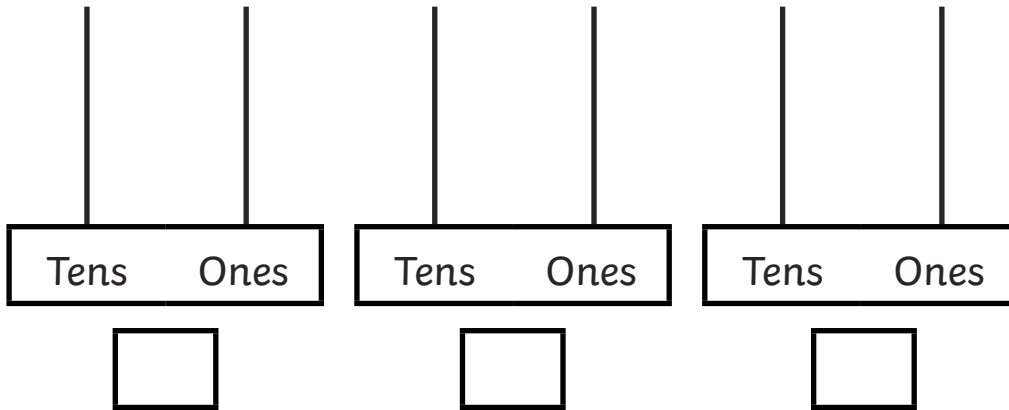
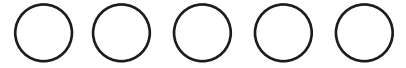




Winning Problems

2. Can you order the numbers from smallest to largest?

3. Greg says, "There are 5 beads on my abacus."
How many points might the Golden Gang have?



4. Can you order the numbers from smallest to largest?

5. How many possible scores do you think you will be able to find for 6 beads? Why do you think that?



Winning Problems

6. Sam says, "There are 6 beads on my abacus."
How many points might the Sporty Squad have?



Tens	Ones	Tens	Ones	Tens	Ones
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Tens	Ones	Tens	Ones	Tens	Ones
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Tens	Ones	Tens	Ones	Tens	Ones
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7. How many different possible scores did you find?

8. How do you know you have found them all?



Answers

1. Possible numbers made with 4 beads: 4, 13, 22, 31, 40
2. 4, 13, 22, 31, 40
3. Possible numbers made with 5 beads: 5, 14, 23, 32, 41, 50
4. 5, 14, 23, 32, 41, 50
5. There are 7 possible numbers that can be made with 6 beads. Children may have spotted that the number of possible numbers is the number of beads + 1.
6. Possible numbers made with 6 beads: 6, 15, 24, 33, 42, 51, 60
7. 7
8. Children may explain that the number of possible numbers is the number of beads + 1.
They may explain that they started with all the beads in the ones column and moved one across to the tens at a time until all the beads were in the tens column. In working this way, they will have found all possible numbers.



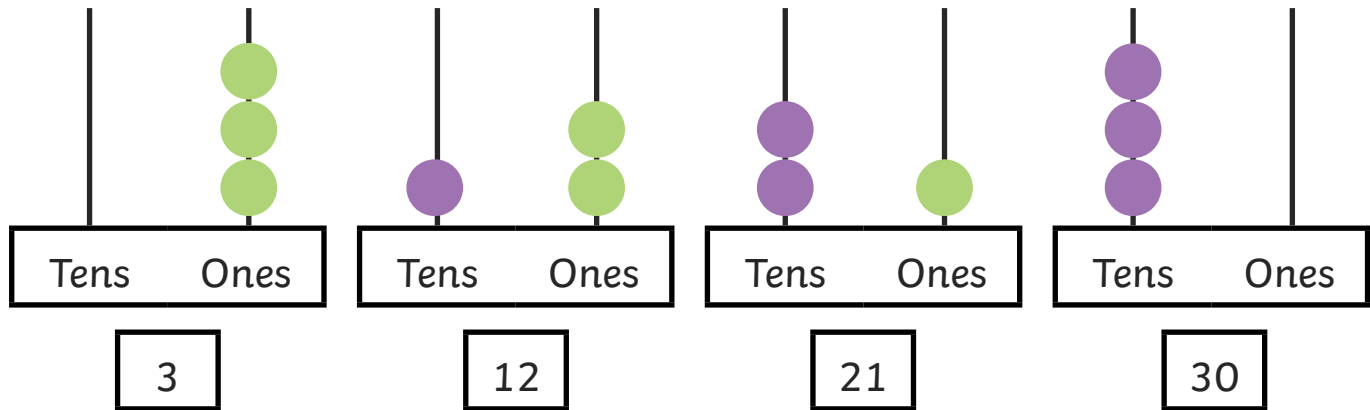
Winning Problems

I can use place value and number facts to solve problems.

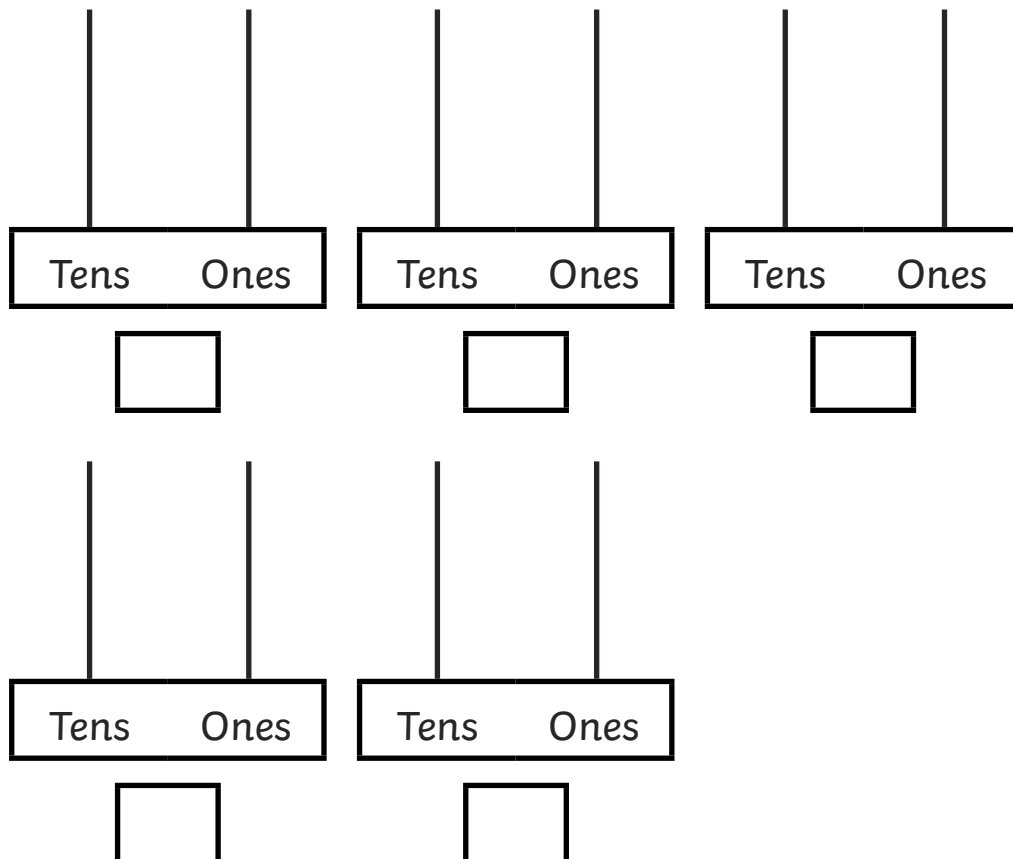


Tia says, "There are 3 beads on my abacus."

Team Twinkl might have 3 points, 12 points, 21 points, or 30 points.



1. Harry says, "There are 4 beads on my abacus."
How many points might the Happy Heroes have?





Winning Problems

2. Can you write the scores in order from smallest to largest?

3. Put the possible numbers made with 4 beads into the table below. Write them in order from smallest to largest.

4. Use your Abacus Template and some counters to investigate the numbers you can make with 5, 6, 7 or 8 beads. Fill in the table.

Team Twinkl	Happy Heroes	Golden Gang	Fast Friends	Speedy Superstars	Quick Kings
3 beads	4 beads	5 beads	6 beads	7 beads	8 beads
4 numbers					
3					
12					
21					
30					

5. Can you spot a pattern for how many numbers you are able to make with each number of beads?

6. Can you spot any other patterns?



Answers

1. Possible numbers made with 4 beads: 4, 13, 22, 31, 40
2. 4, 13, 22, 31, 40
3. and 4.

Team Twinkl	Happy Heroes	Golden Gang	Fast Friends	Speedy Superstars	Quick Kings
3 beads	4 beads	5 beads	6 beads	7 beads	8 beads
4 numbers	5 numbers	6 numbers	7 numbers	8 numbers	9 numbers
3	4	5	6	7	8
12	13	14	15	16	17
21	22	23	24	25	26
30	31	32	33	34	35
	40	41	42	43	44
		50	51	52	53
			60	61	62
				70	71
					80

5. The number of possible scores is the number of beads + 1.
6. Children may spot that in each column, there is a difference of 9 between each of the possible scores.
They may spot patterns across the columns, e.g. if the number of beads has increased by 1, all the possible scores have increased by 1.
They may spot that when placed in order from smallest to largest, the possible scores for each column alternate between odd and even.
They may spot that as the number of beads goes up by one, the numbers from the previous column have increased by 10. For example, for 3 beads, a possible score is 3. For 4 beads, a possible score is 13. For 3 beads, a possible score is 12. For 4 beads, a possible score is 22. And so on.
Accept any other correct patterns the children spot.



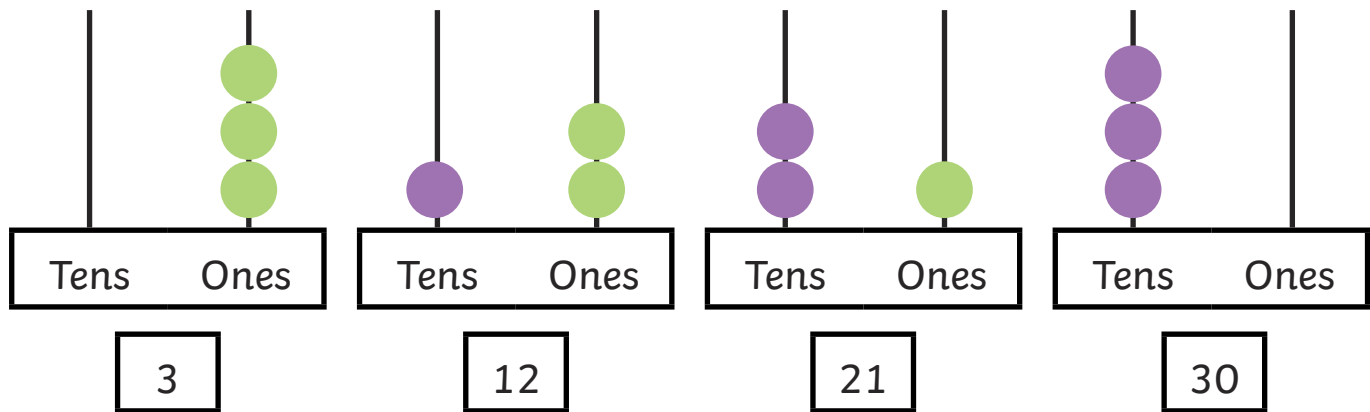
Winning Problems

I can use place value and number facts to solve problems.



Tia says, "There are 3 beads on my abacus."

Team Twinkl might have 3 points, 12 points, 21 points, or 30 points.



Tia records her possible scores in the results table on the next page, ordering the numbers from smallest to largest.

1. Look at the numbers in the Team Twinkl column. What do you notice about what happens to the tens and ones?

2. Use the pattern you have spotted to help you fill in the possible results for using 5, 7 or 9 beads. You could use the Abacus Template and some counters to help you.

3. Can you notice any other patterns with the numbers?



Winning Problems

Team Twinkl	Golden Gang	Speedy Superstars	Sporty Squad
3 beads	5 beads	7 beads	9 beads
4 numbers	6 numbers	8 numbers	10 numbers
3 12 21 30			

Challenge

What do you think would happen if you had 10 beads? How would the pattern change? Why?



Answers

Team Twinkl	Golden Gang	Speedy Superstars	Sporty Squad
3 beads	5 beads	7 beads	9 beads
4 numbers	6 numbers	8 numbers	10 numbers
3	5	7	9
12	14	16	18
21	23	25	27
30	32	34	36
	41	43	45
	50	52	54
		61	63
		70	72
			81
			90

1. If you start with all the beads in the ones column, the number in the ones column then gets smaller by one as the number in the tens column gets bigger by one.
2. Answers are shown in the table above.
3.
 - Children may spot that the number of possible scores is the number of beads + 1.
 - They may spot that in each column, there is a difference of 9 between each of the possible scores.
 - They may spot patterns across the columns, e.g. if the number of beads has increased by 2, all the possible scores have increased by 2.
 - They may spot that when placed in order from smallest to largest, the possible scores for each column alternate between odd and even.
 - They may spot that the possible numbers for the lower numbers of beads are present in the possible numbers for the higher numbers of beads, but with tens added. For example, for 3 beads, a possible score is 3. For 5 beads, a possible score is 23. For 7 beads, a possible score is 43. And so on.
 - Accept any other correct patterns the children spot.



Answers

Challenge

Once you get to 10, it is no longer possible to place all of the beads in the ones column and then move them across one at a time. You also cannot have all of the beads in the tens column. This reduces the number of possible scores.

9 possible scores with 10 beads: 19, 28, 37, 46, 55, 64, 73, 82, 91

8 possible scores with 11 beads: 29, 38, 47, 56, 65, 74, 83, 92

7 possible scores with 12 beads: 39, 48, 57, 66, 75, 84, 93

And so on.

Children might notice a new pattern here with the possible scores you can make being 10 more than for the previous possible scores, but with fewer possible scores.

Some children may start to explore splitting the beads across three columns (hundreds, tens and ones) to explore three-digit numbers.