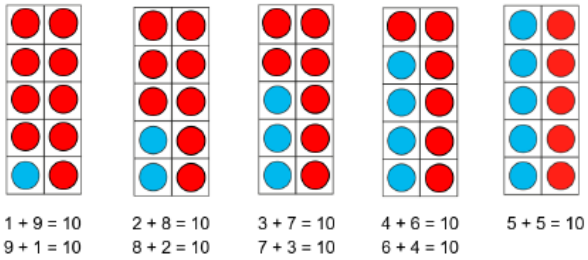
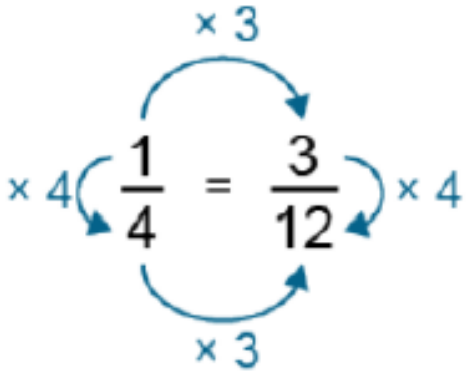
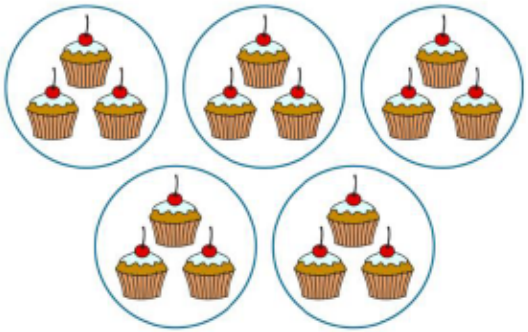
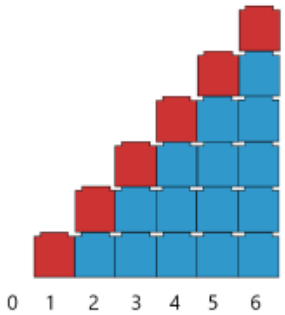
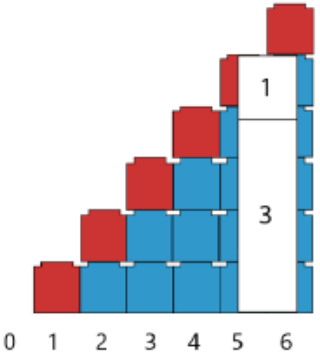




Visual Coding
Key Representations
Progression from years 1-6
Autumn Term

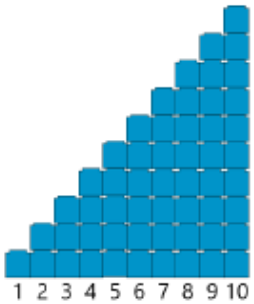


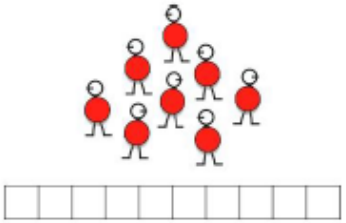




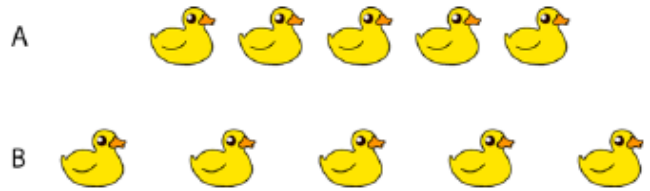
Visual coding: key representations

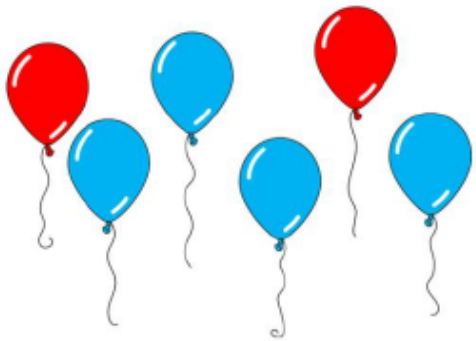
Year 1:1.1

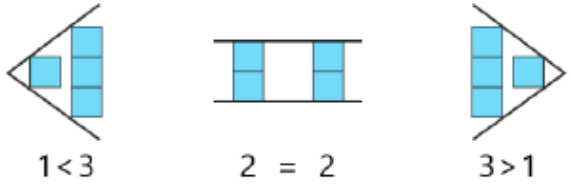


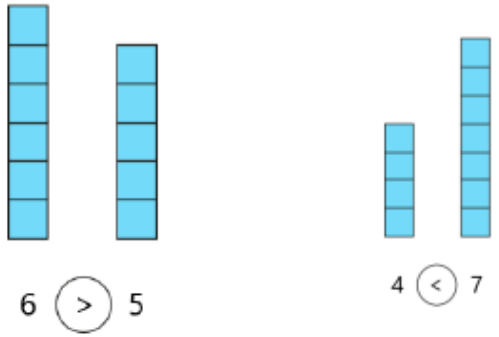


1	2	3	4	5	6	7	8	9	10
one	two	three	four	five	six	seven	eight	nine	ten



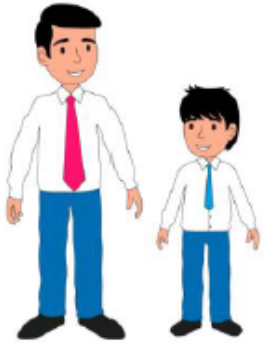


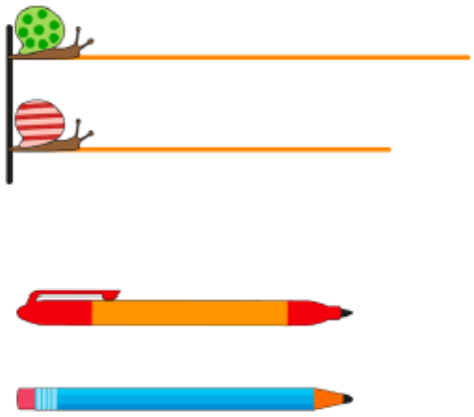


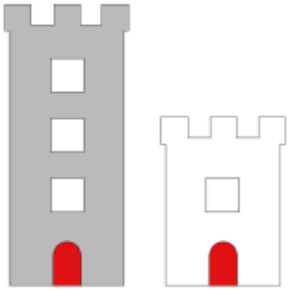


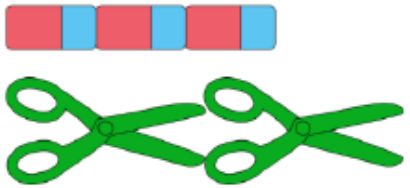
Visual coding: key representations

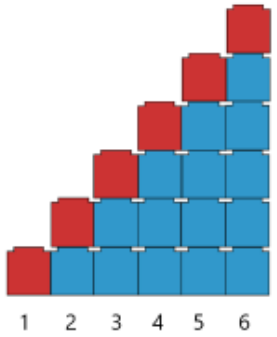
Year 1:1.2

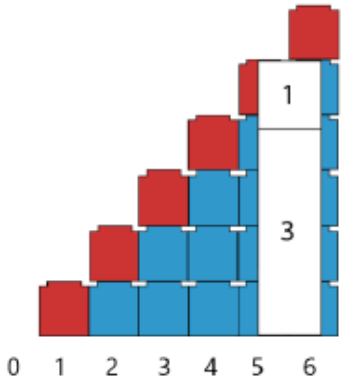


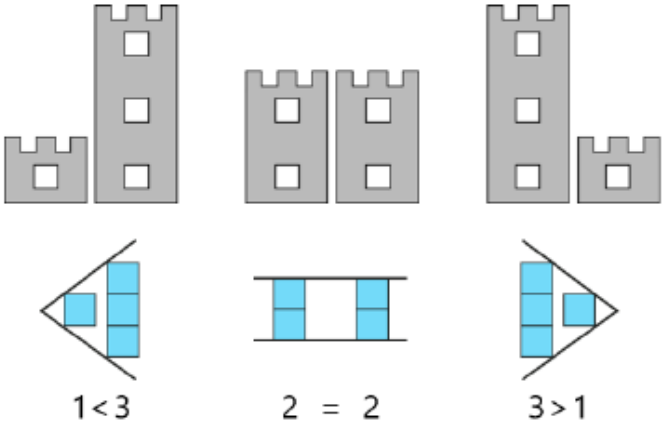


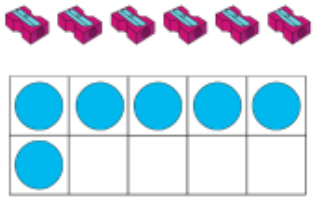












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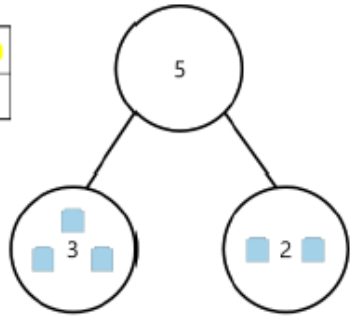
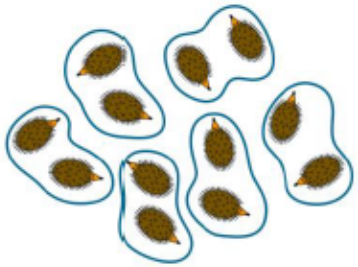


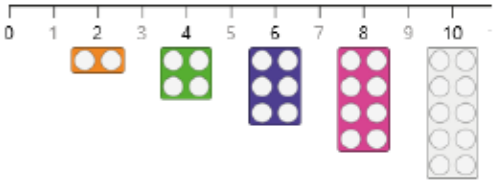
Visual coding: key representations

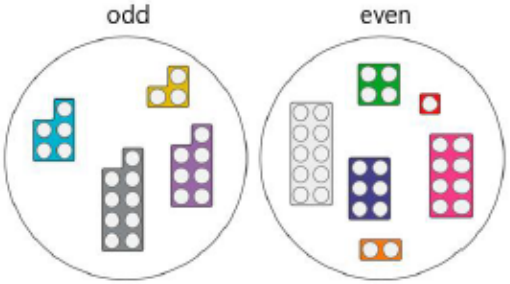
Year 1:1.3

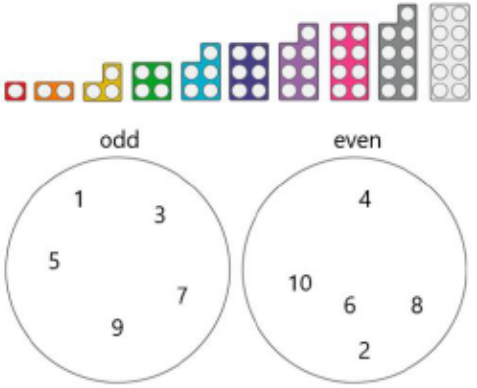
How many shoes are there?
Count in groups of two.

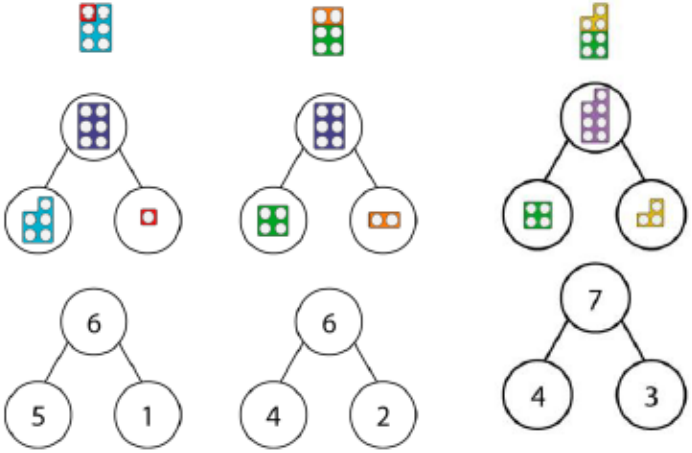
How many hedgehogs are there?

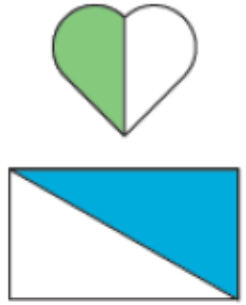






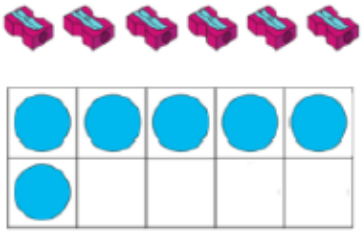


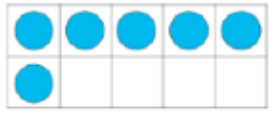


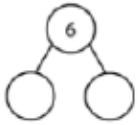


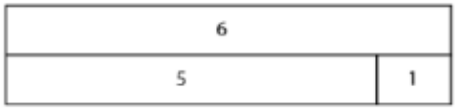
Visual coding: key representations

Year 1:1.4









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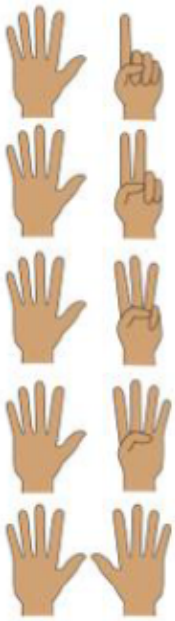
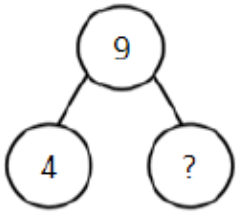
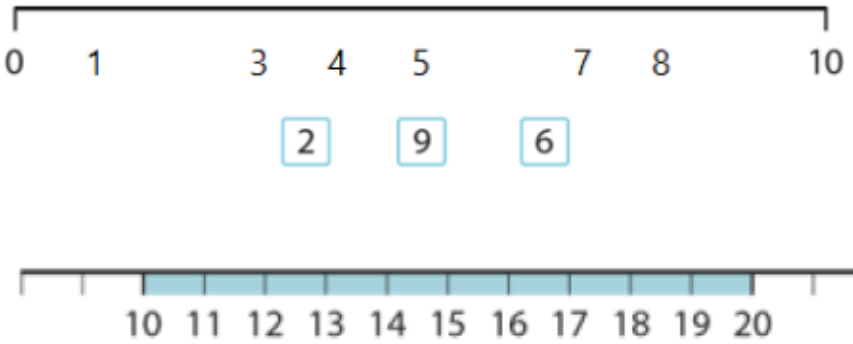
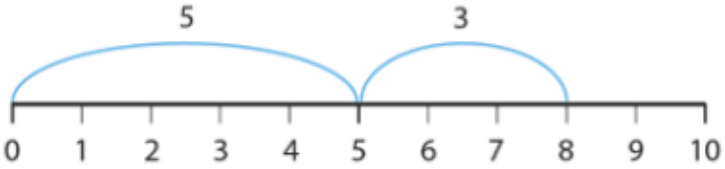
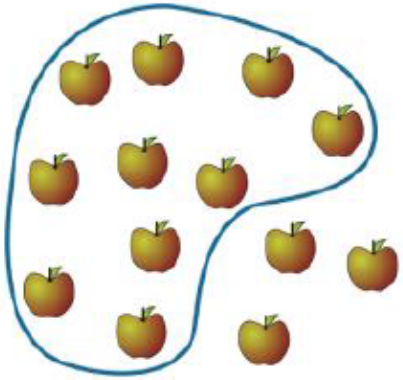








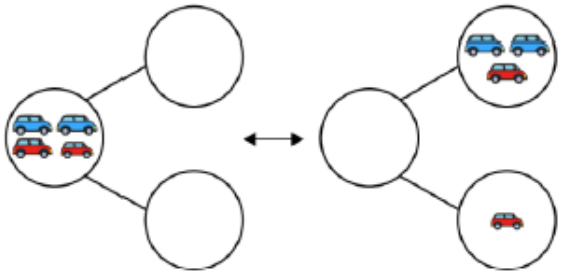


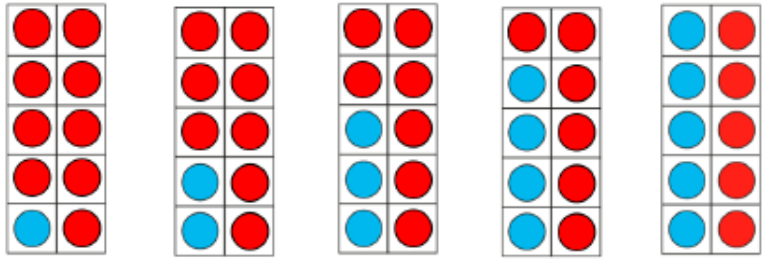
10s	1s

Visual coding: key representations

Year 2: 2.1

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	100





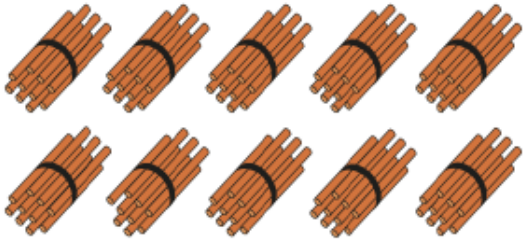
1 + 9 = 10
9 + 1 = 10

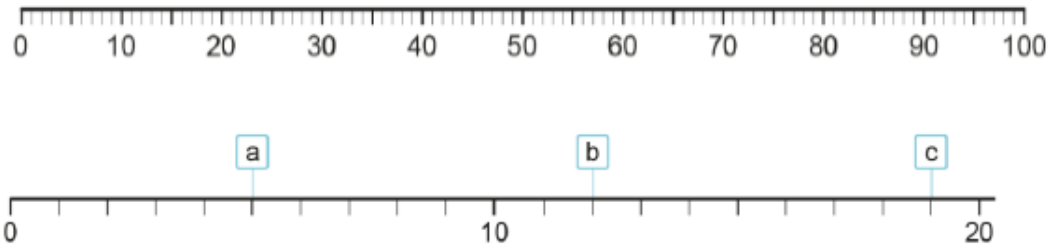
2 + 8 = 10
8 + 2 = 10

3 + 7 = 10
7 + 3 = 10

4 + 6 = 10
6 + 4 = 10

5 + 5 = 10





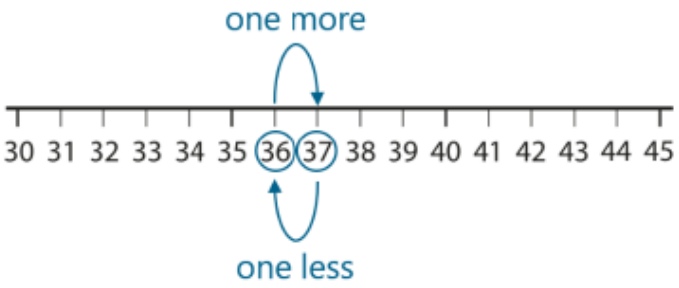
+	0	1	2	3	4	5	6	7	8	9	10
0	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9	0+10
1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	1+10
2	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8	2+9	2+10
3	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7	3+8	3+9	3+10
4	4+0	4+1	4+2	4+3	4+4	4+5	4+6	4+7	4+8	4+9	4+10
5	5+0	5+1	5+2	5+3	5+4	5+5	5+6	5+7	5+8	5+9	5+10
6	6+0	6+1	6+2	6+3	6+4	6+5	6+6	6+7	6+8	6+9	6+10
7	7+0	7+1	7+2	7+3	7+4	7+5	7+6	7+7	7+8	7+9	7+10
8	8+0	8+1	8+2	8+3	8+4	8+5	8+6	8+7	8+8	8+9	8+10
9	9+0	9+1	9+2	9+3	9+4	9+5	9+6	9+7	9+8	9+9	9+10
10	10+0	10+1	10+2	10+3	10+4	10+5	10+6	10+7	10+8	10+9	10+10

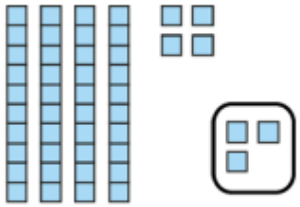
Y1 facts
Y2 facts

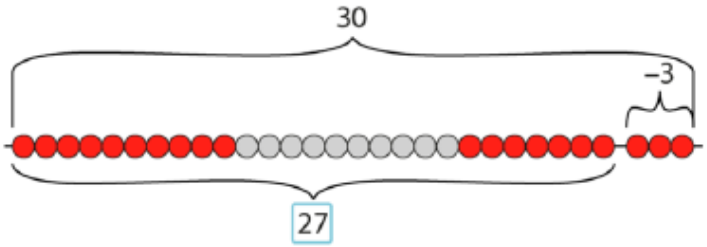
Adding 1
Adding 2
Bonds to 10
Adding 0
Doubles
Near doubles

Visual coding: key representations

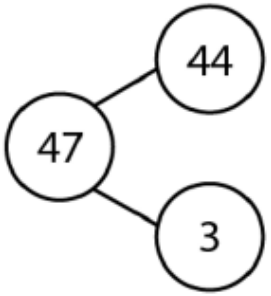
Year 2: 2.2

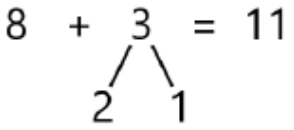


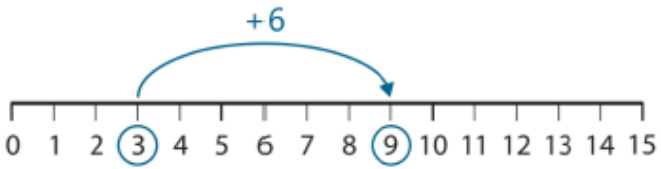


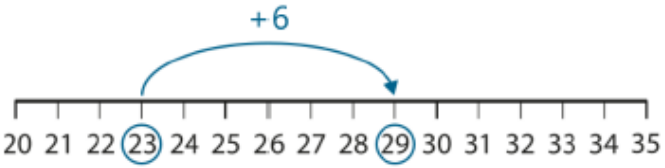


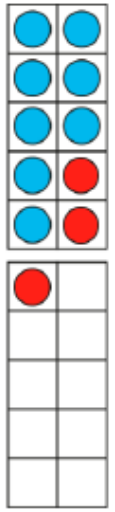
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

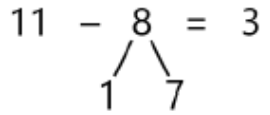


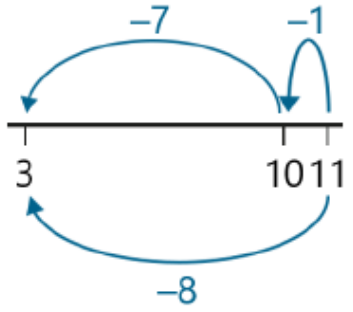












Visual coding: key representations

Year 2: 2.3

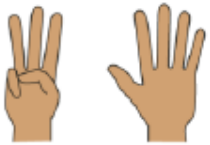


Figure 17: 8 represented as 3 fingers and 5 fingers

Figure 18: 8 represented as 6 and 2 with base 10 number boards

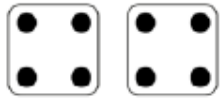


Figure 19: 8 represented as two 4-value dice

Figure 20: 8 represented as 2 rows of 4

Figure 21: 8 represented as tally marks: 5 and 3

Figure 22: 8 represented on a bead string: 7 and 1

5 + 2 = 7

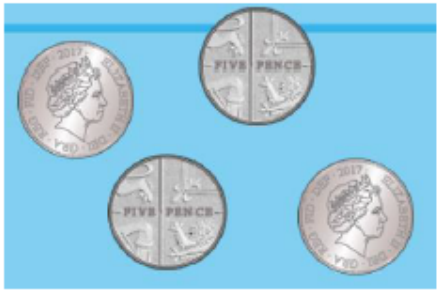


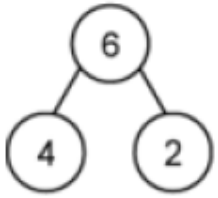
Figure 30: aggregation or partitioning context: 5 cakes altogether, 2 with cherries and 3 without

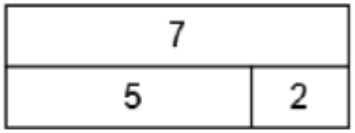
$2+3=5$ $5-3=2$

$5=2+3$ $2=5-3$

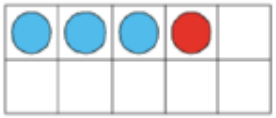
$3+2=5$ $5-2=3$

$5=3+2$ $3=5-2$

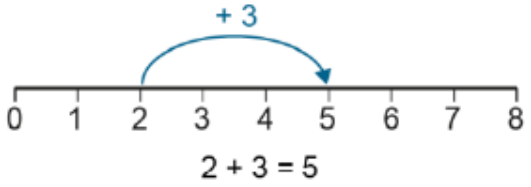




7 – 2 = 5



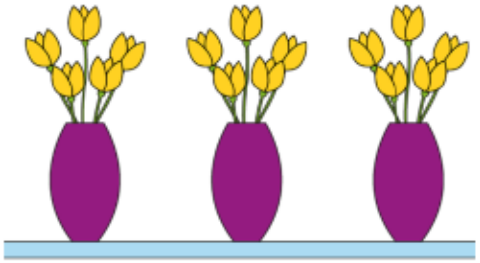
3 + 1 = 4



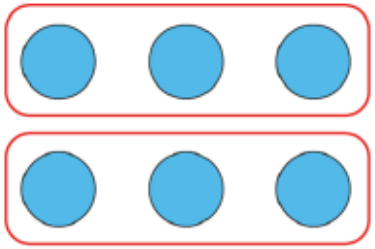
2 + 3 = 5

Visual coding: key representations

Year 2: 2.4

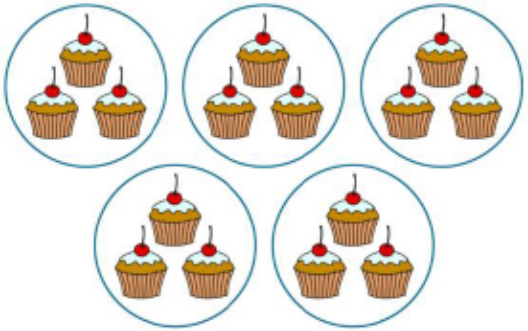


5 + 5 + 5 3 × 5

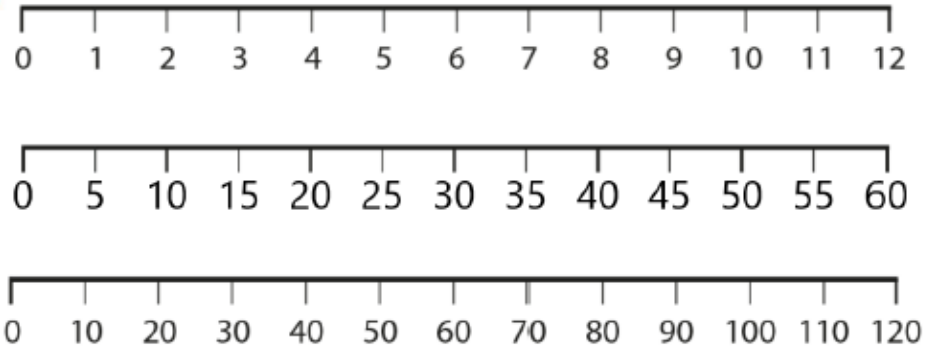


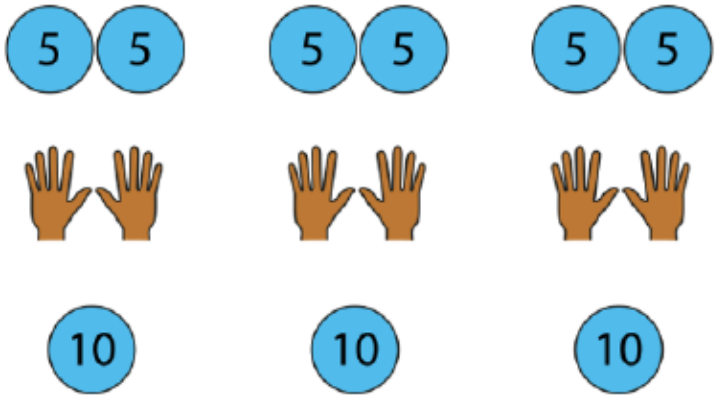
2 × 3

This represents 3 + 3.



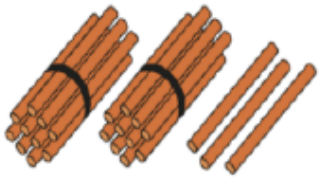
1000	2000	3000	4000	5000	6000	7000	8000	9000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9

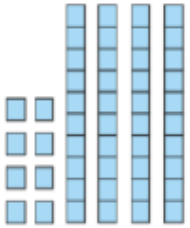


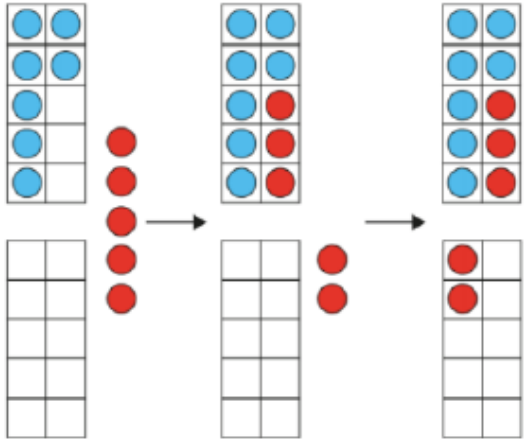


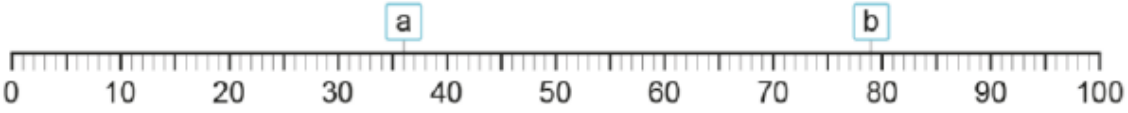
Visual coding: key representations

Year 3: 3.1

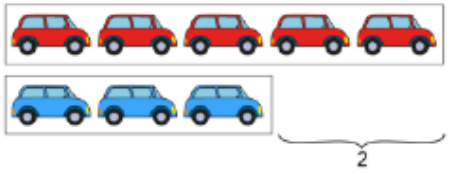


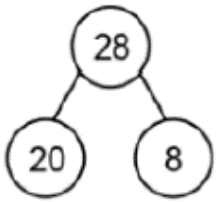


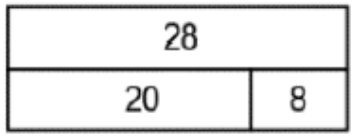


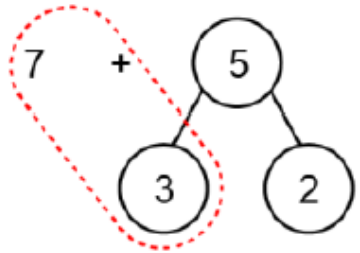


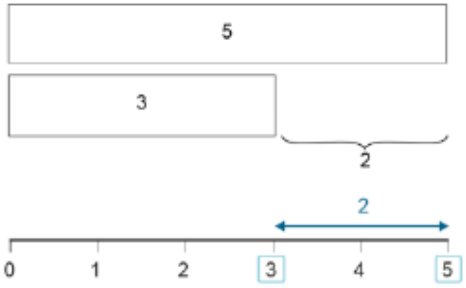
$7 + 5 = 12$











$20 + 8 = 28$ $\quad 28 - 20 = 8$

$8 + 20 = 28$ $\quad 28 - 8 = 20$

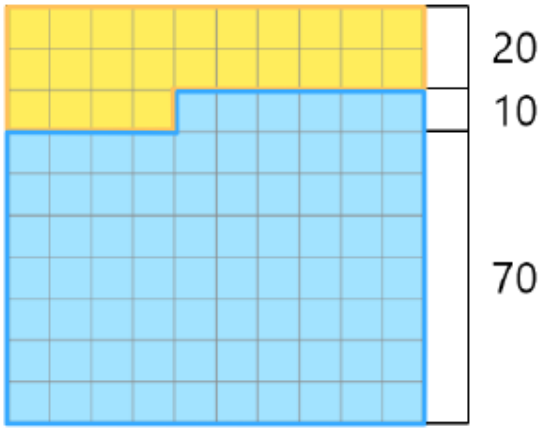
$28 = 20 + 8$ $\quad 8 = 28 - 20$

$28 = 8 + 20$ $\quad 20 = 28 - 8$

Visual coding: key representations

Year 3: 3.2

24 + 76 = 100



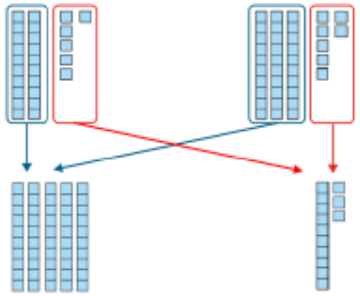
24 + 76 = 100

20 4 6 70

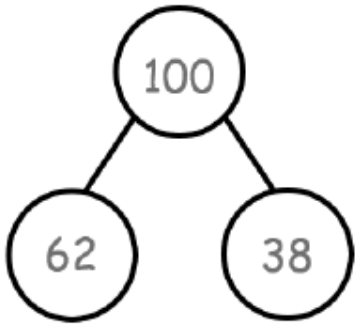
10

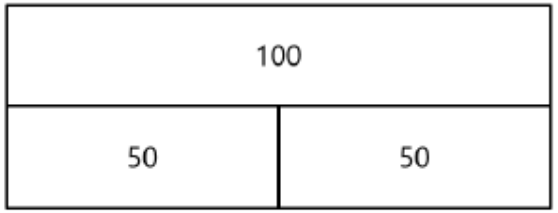
= £63

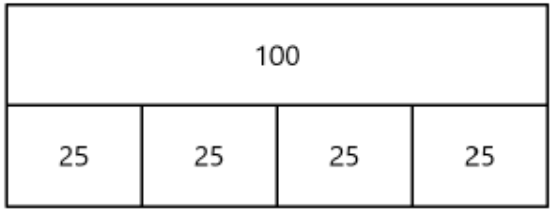
26 + 37 = 63

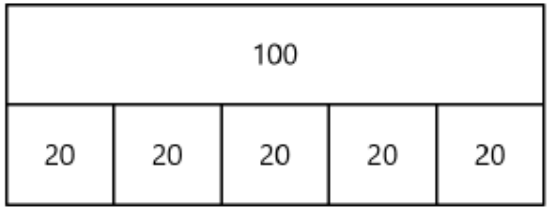


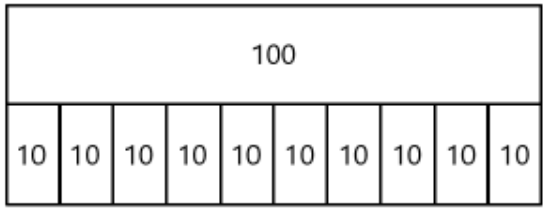
50 + 13 = 63

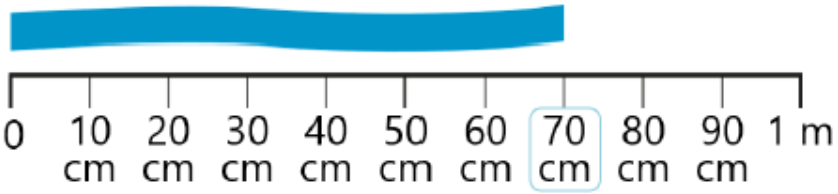












Visual coding: key representations

Year 3: 3.3

Figure 52: recognising equal groups – 3 groups of 5 eggs

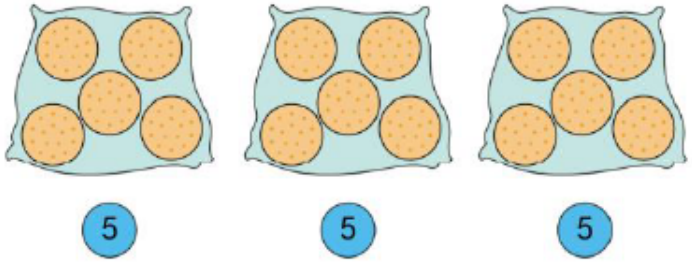
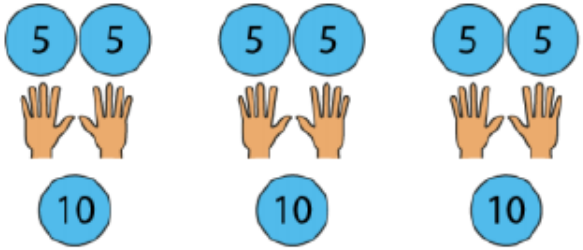


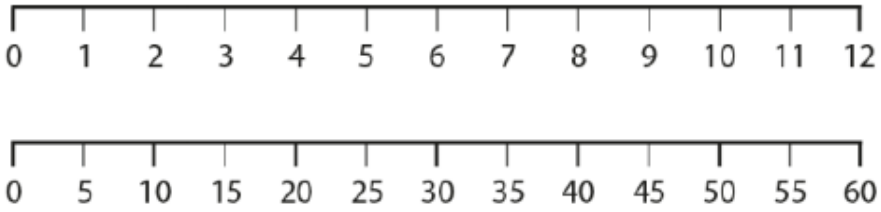
Figure 54: 3 bags of 5 biscuits alongside three 5-value counters

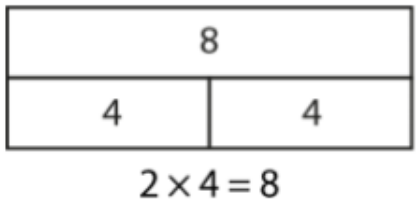


$6 \times 5 = 30$

$3 \times 10 = 30$

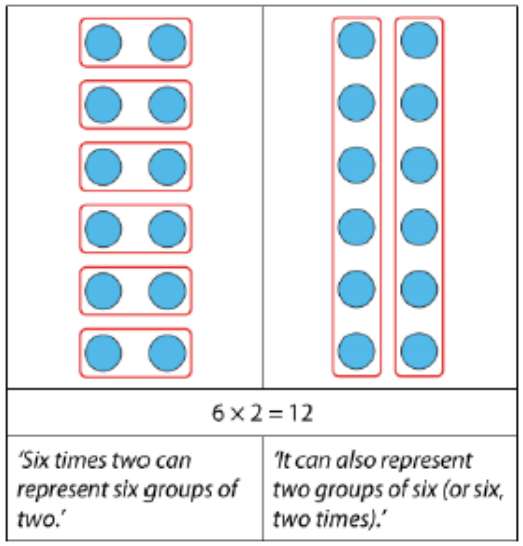
Stacked number lines:

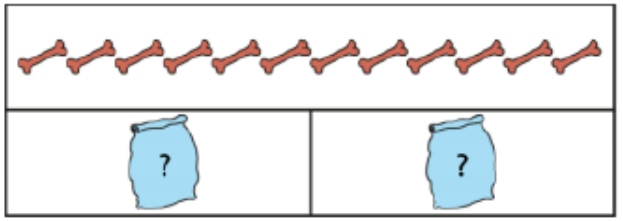




Half of 8 is equal to ___.

Double ___ is equal to 8.

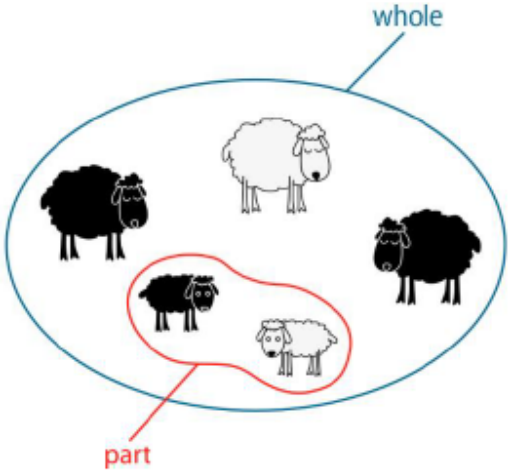




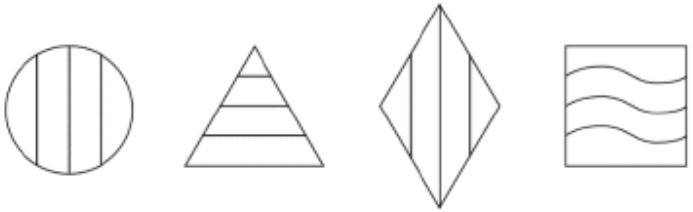
$2 \times \square = 12$ $\qquad$ $\square \times 2 = 12$

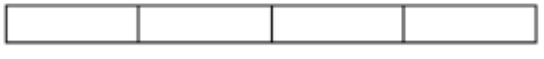
Visual coding: key representations

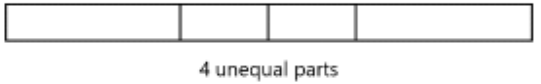
Year 3: 3.4

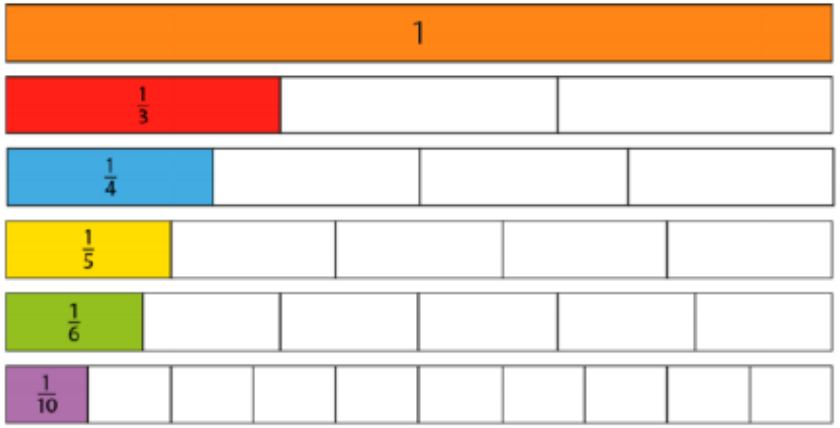


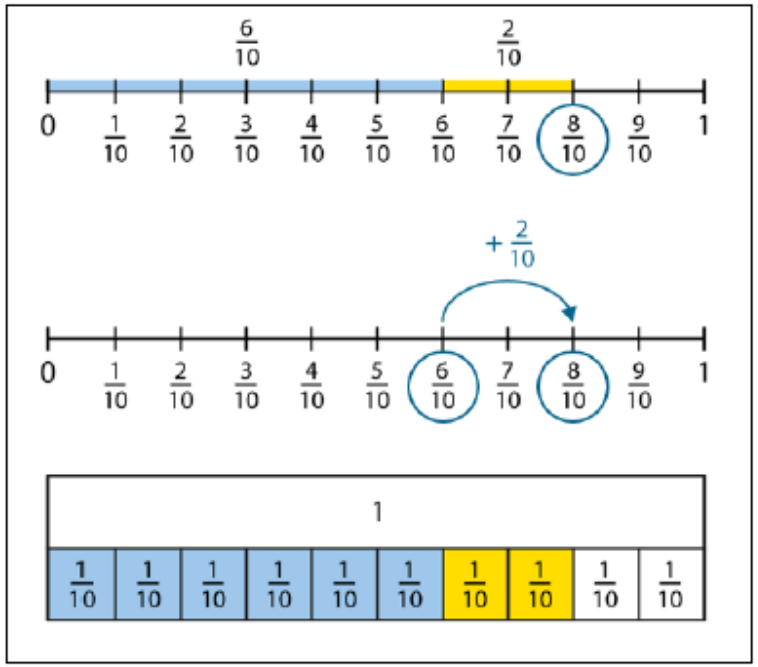
Equal or unequal parts?





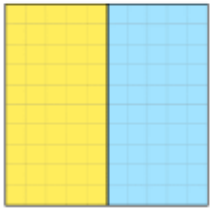


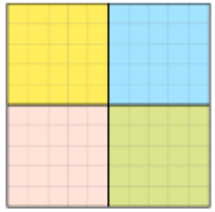




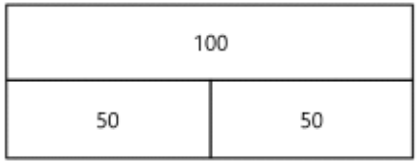
Visual coding: key representations

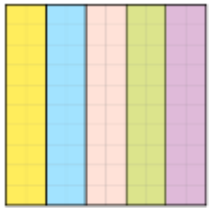
Year 3: 3.5

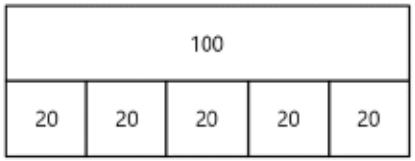


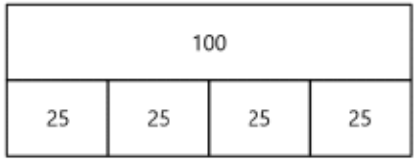


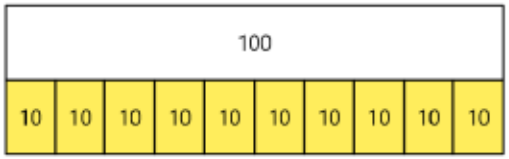
2, 4, 5 and 10 part composition of 100

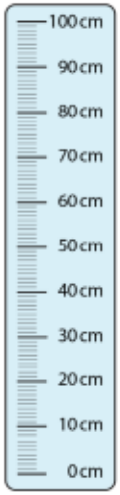




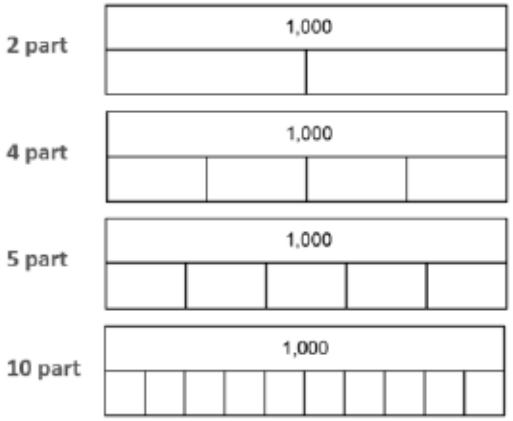




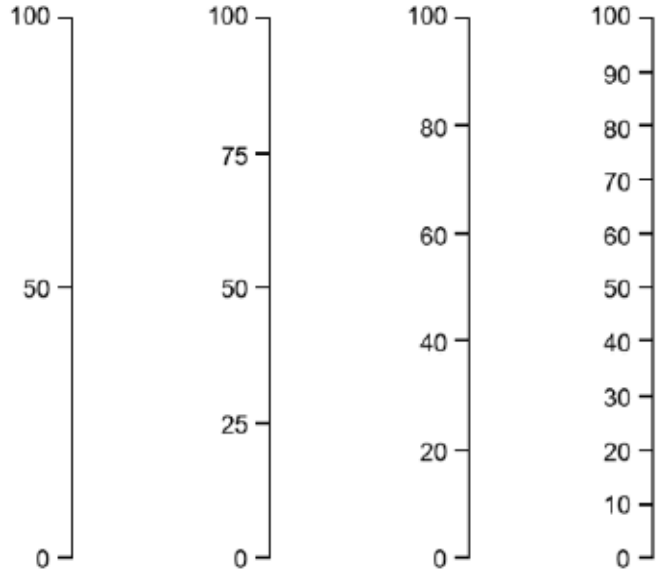




2, 4, 5 and 10 part composition of 1,000

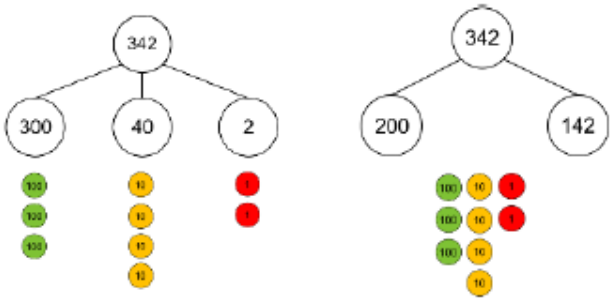


Related to scale



Visual coding: key representations

Year 4: 4.1



342

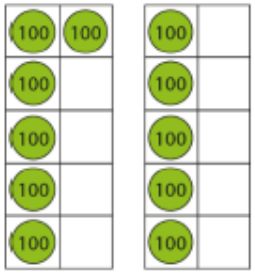
1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9

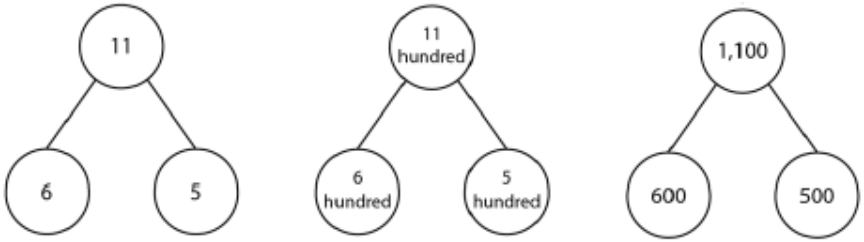
300 + 40 + 2 = 342

1,400

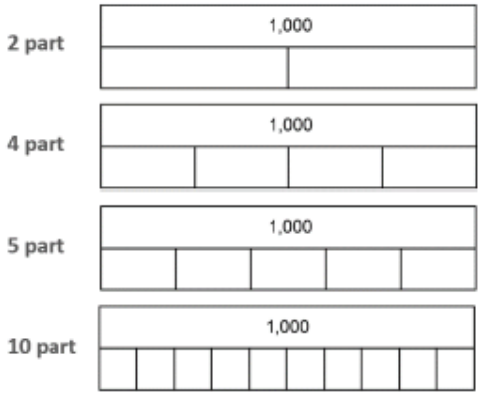
1,000s	100s	10s	1s
1	4	0	0

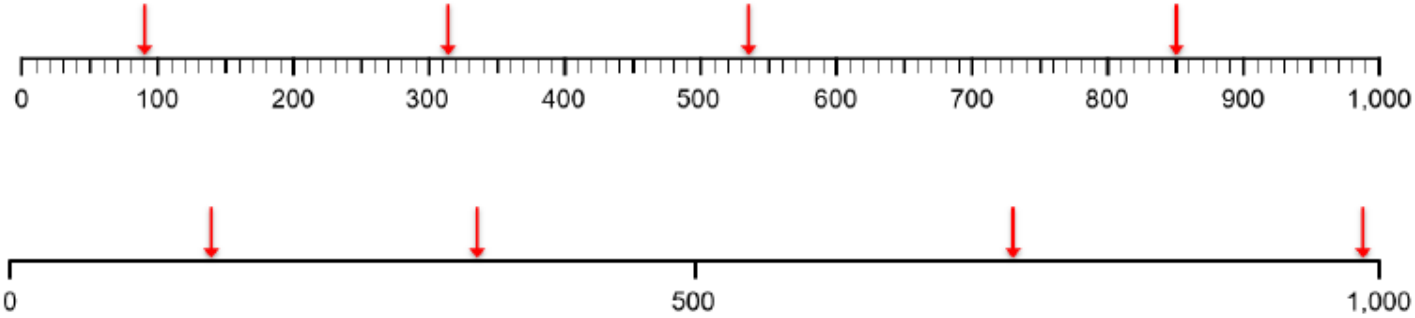
600 + 500= 1,100





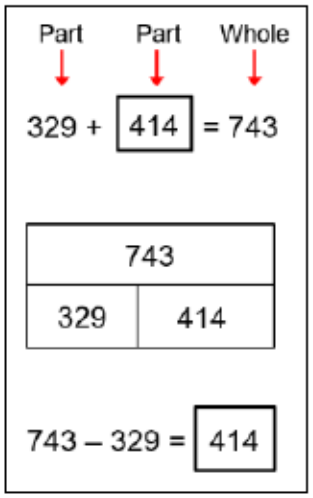
2, 4, 5 and 10 part composition of 1,000

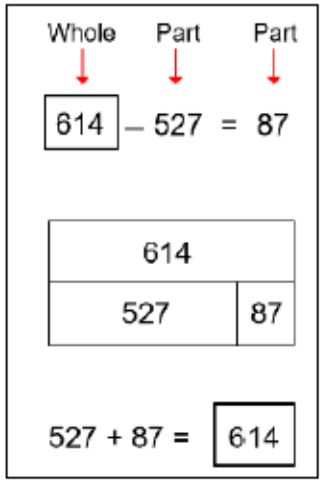


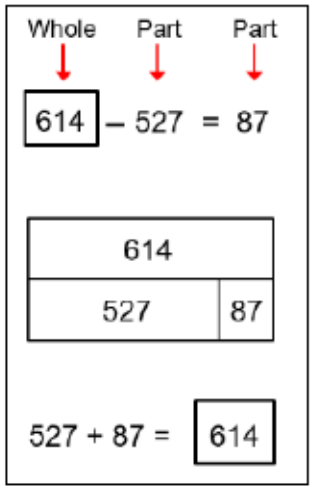


Visual coding: key representations

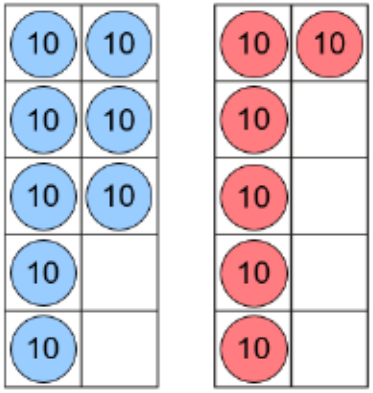
Year 4: 4.2







+	0	1	2	3	4	5	6	7	8	9	10
0	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9	0+10
1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	1+10
2	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8	2+9	2+10
3	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7	3+8	3+9	3+10
4	4+0	4+1	4+2	4+3	4+4	4+5	4+6	4+7	4+8	4+9	4+10
5	5+0	5+1	5+2	5+3	5+4	5+5	5+6	5+7	5+8	5+9	5+10
6	6+0	6+1	6+2	6+3	6+4	6+5	6+6	6+7	6+8	6+9	6+10
7	7+0	7+1	7+2	7+3	7+4	7+5	7+6	7+7	7+8	7+9	7+10
8	8+0	8+1	8+2	8+3	8+4	8+5	8+6	8+7	8+8	8+9	8+10
9	9+0	9+1	9+2	9+3	9+4	9+5	9+6	9+7	9+8	9+9	9+10
10	10+0	10+1	10+2	10+3	10+4	10+5	10+6	10+7	10+8	10+9	10+10



8 + 6

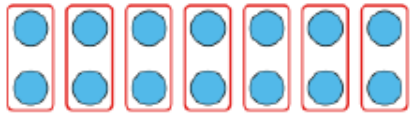
8 tens + 6 tens

80 + 60

1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9

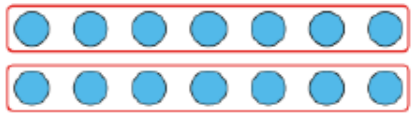
Visual coding: key representations

Year 4: 4.3



7 groups of 2

$7 \times 2 = 14$



2 groups of 7

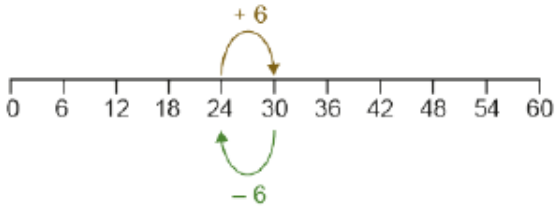
$2 \times 7 = 14$

$7 \times 2 = 2 \times 7$

0 × 6 = 0	6 × 0 = 0
1 × 6 = 6 (+ 6)	6 × 1 = 6 (+ 6)
2 × 6 = 12 (+ 6)	6 × 2 = 12 (+ 6)
3 × 6 = 18 (+ 6)	6 × 3 = 18 (+ 6)
4 × 6 = 24 (+ 6)	6 × 4 = 24 (+ 6)
5 × 6 = 30 (+ 6)	6 × 5 = 30 (+ 6)
6 × 6 = 36	6 × 6 = 36
7 × 6 = 42	6 × 7 = 42
8 × 6 = 48	6 × 8 = 48
9 × 6 = 54	6 × 9 = 54
10 × 6 = 60	6 × 10 = 60
11 × 6 = 66	6 × 11 = 66
12 × 6 = 72	6 × 12 = 72

	× 7
0	0
1	7
2	14
3	21
4	28
5	35
6	42
7	49
8	56
9	63
10	70
11	77
12	84

↓ + 7
↑ − 7
↓ + 7
↓ + 7



×	1	2	3	4	5	6
1						
2						
3						
4						
5						

$14 \div 7 = 2$

Partitive division

Figure 121: 7 groups of 2 – 7 nests of 2 eggs and seven 2-value counters

Language focus

"14 shared between 7 is equal to 2."

"The 14 represents the total number of eggs."

"The 7 represents the number of nests/shares."

"The 2 represents the number of eggs in each nest/share."

Quotitive division

Figure 122: 2 groups of 7 – 2 nests of 7 eggs and two 7-value counters

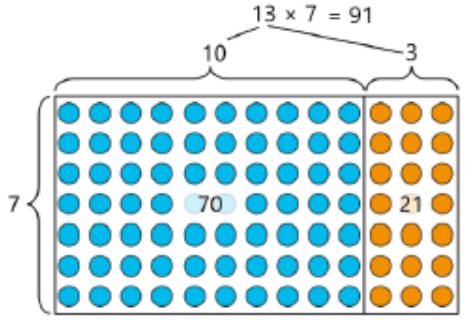
Language focus

"14 divided into groups of 7 is equal to 2.

"The 14 represents the total number of eggs."

"The 7 represents the number of eggs in each nest/group."

"The 2 represents the number of nests/groups."



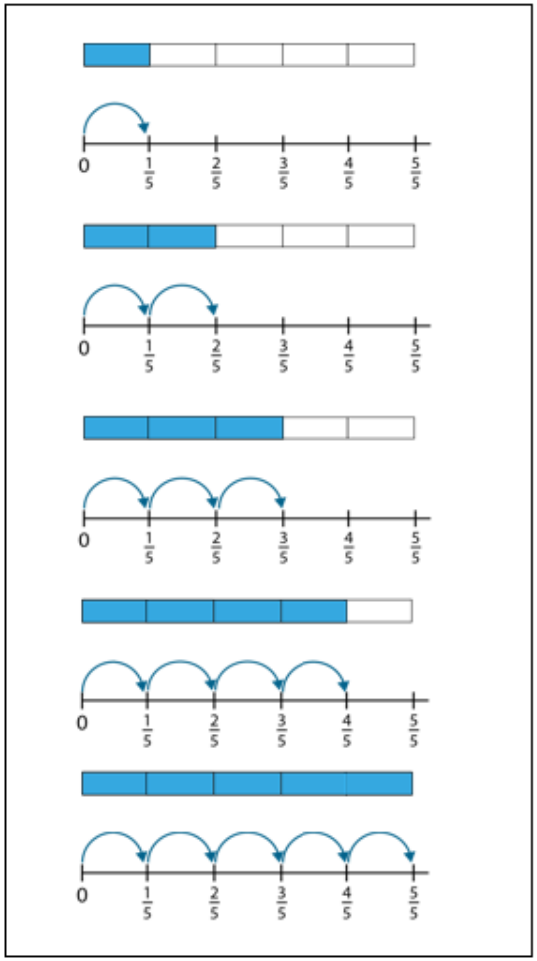
$13 \times 7 = 10 \times 7 + 3 \times 7$

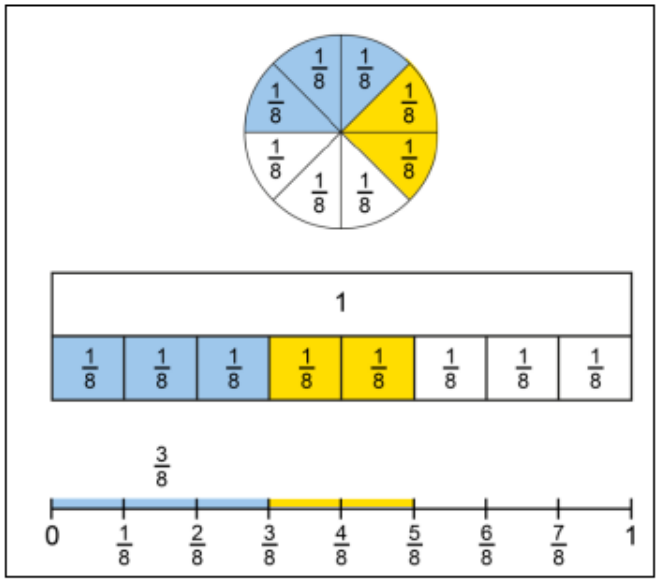
$= 70 + 21$

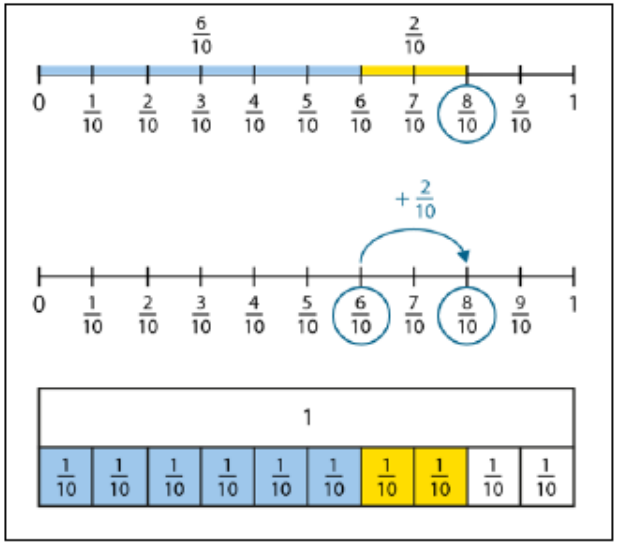
$= 91$

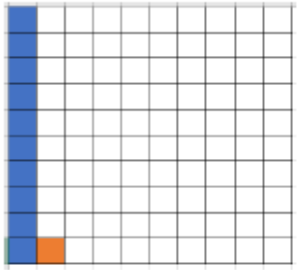
Visual coding: key representations

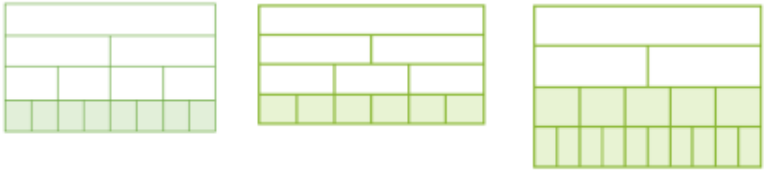
Year 4: 4.4







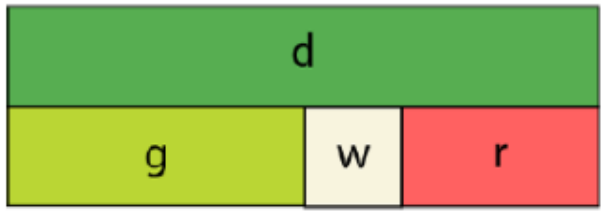




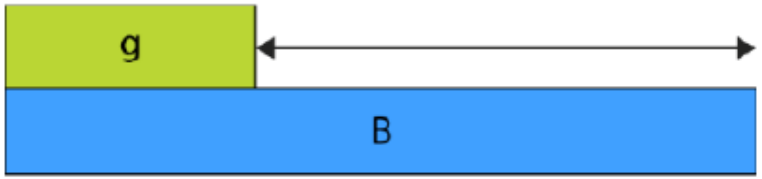
Visual coding: key representations

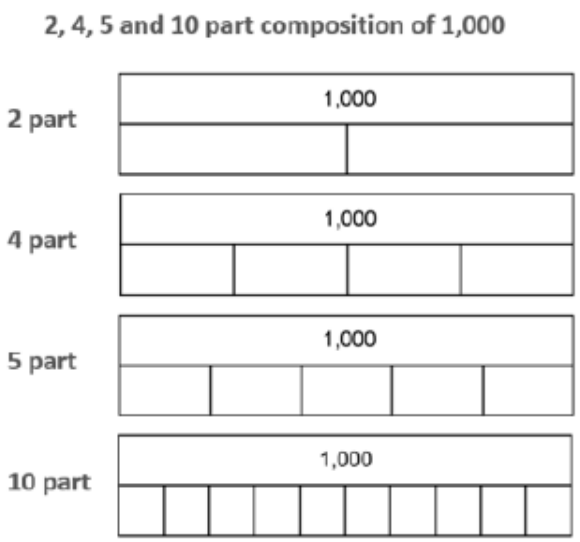
Year 4: 4.5

1. Additive – combining or partitioning

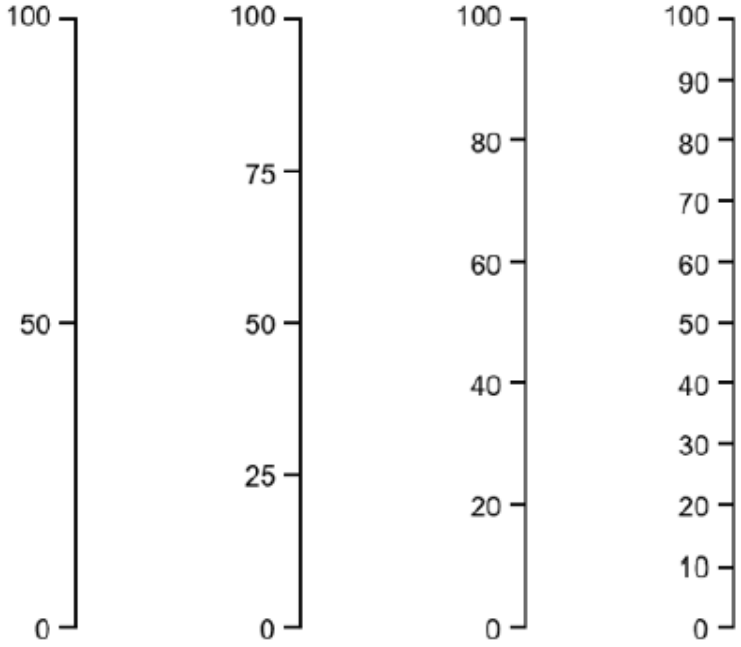


2. Additive – comparative



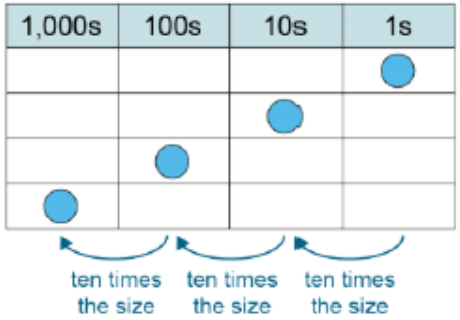


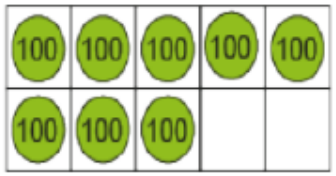
Related to scale

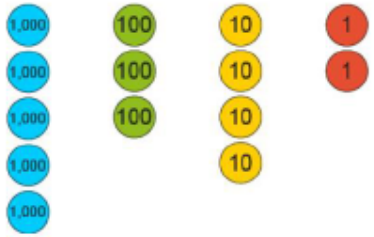


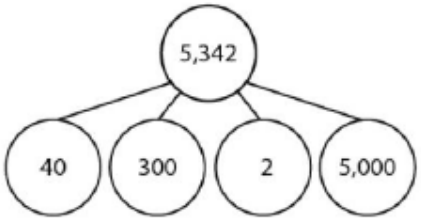
Visual coding: key representations

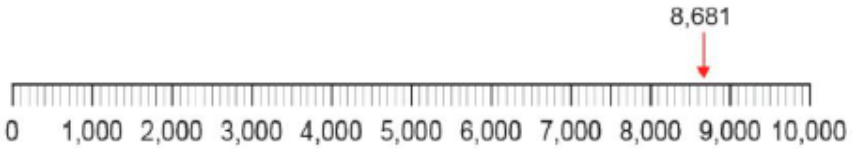
Year 5: 5.1

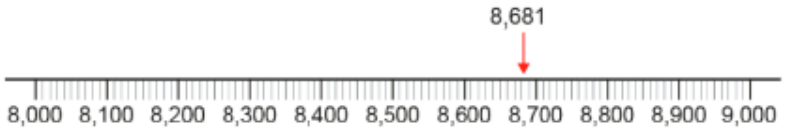


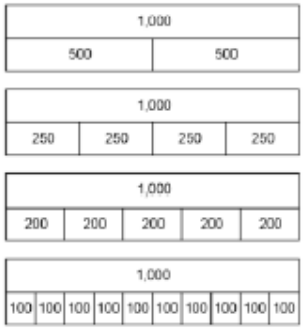






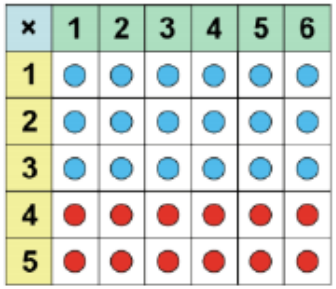


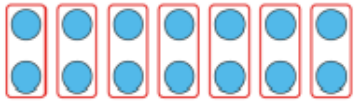




Visual coding: key representations

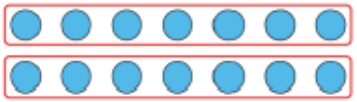
Year 5: 5.2





7 groups of 2

7 × 2 = 14



2 groups of 7

2 × 7 = 14

7 × 2 = 2 × 7

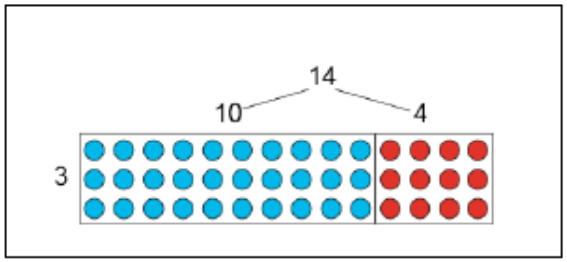
1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9

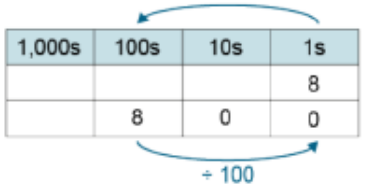
× 10 (100 → 1,000; 10 → 100; 1 → 10)

÷ 10 (1,000 → 100; 100 → 10; 10 → 1)

80 × 10 = 800

80 ÷ 10 = 8





8 × 100 = 800

800 ÷ 100 = 8

Figure 121: 7 groups of 2 – 7 nests of 2 eggs and seven 2-value counters

Language focus

"14 shared between 7 is equal to 2."

"The 14 represents the total number of eggs."

"The 7 represents the number of nests/shares."

"The 2 represents the number of eggs in each nest/share."

Figure 122: 2 groups of 7 – 2 nests of 7 eggs and two 7-value counters

Language focus

"14 divided into groups of 7 is equal to 2.

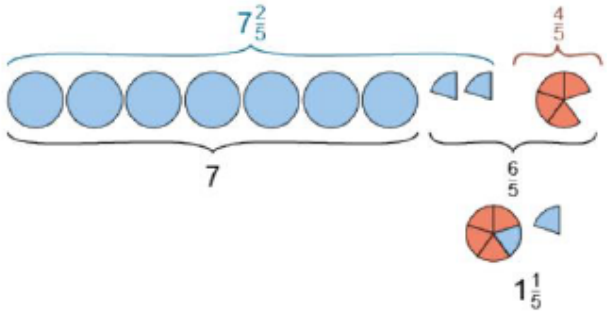
"The 14 represents the total number of eggs."

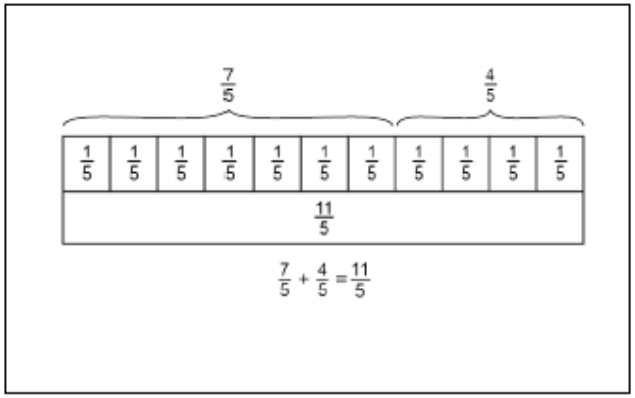
"The 7 represents the number of eggs in each nest/group."

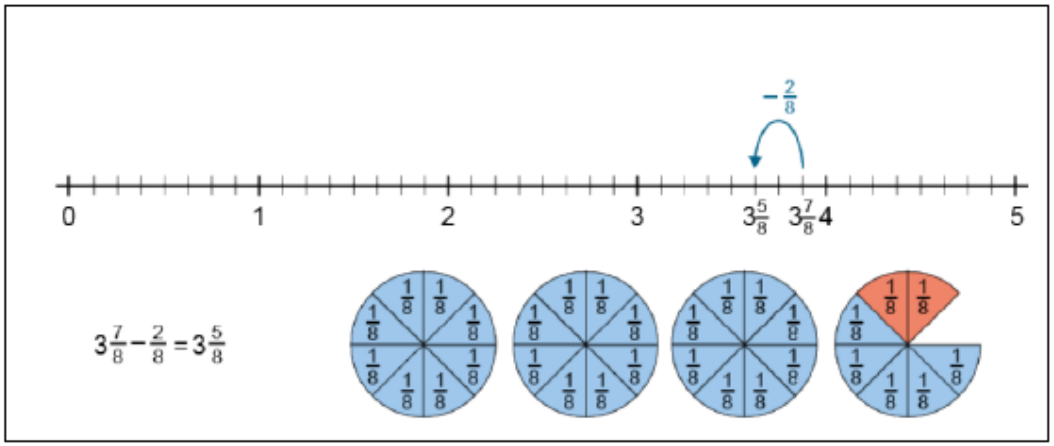
"The 2 represents the number of nests/groups."

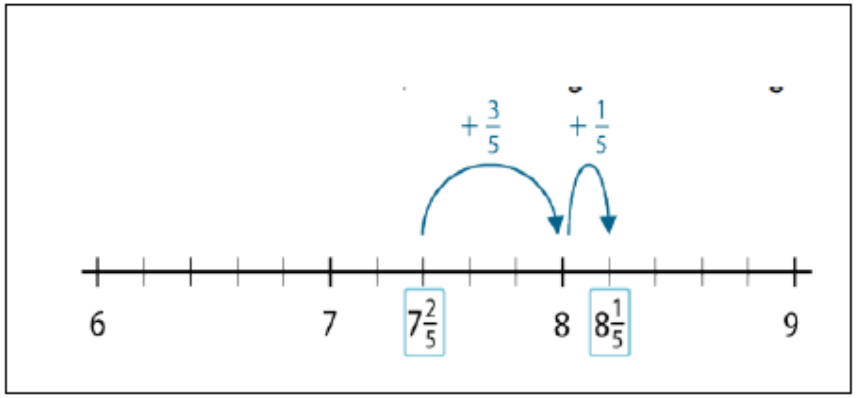
Visual coding: key representations

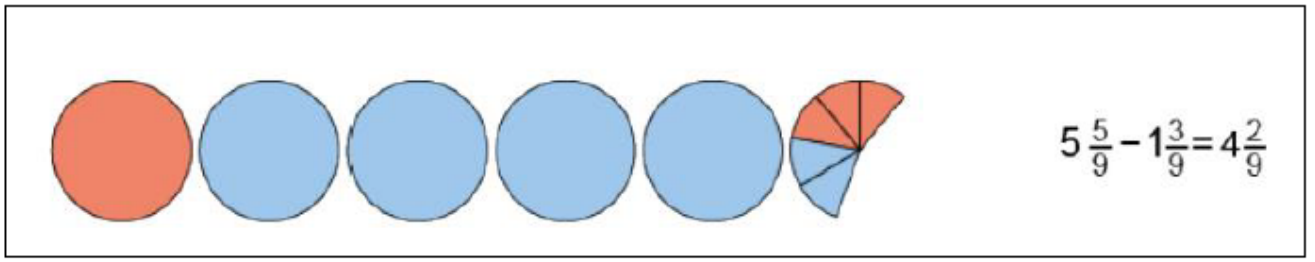
Year 5: 5.3





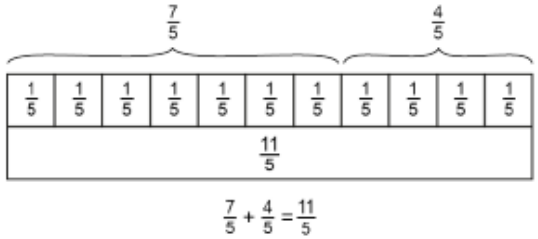


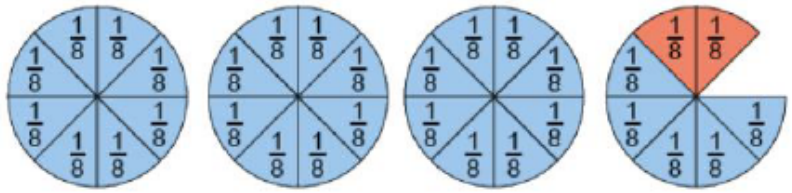


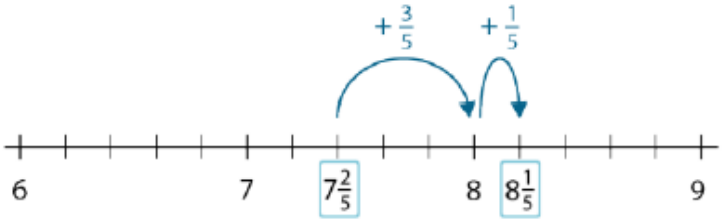


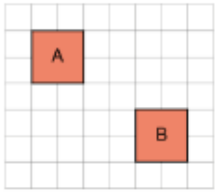
Visual coding: key representations

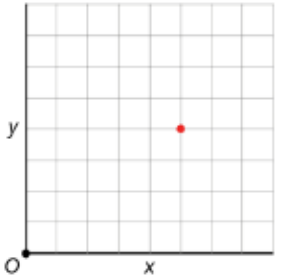
Year 5: 5.4

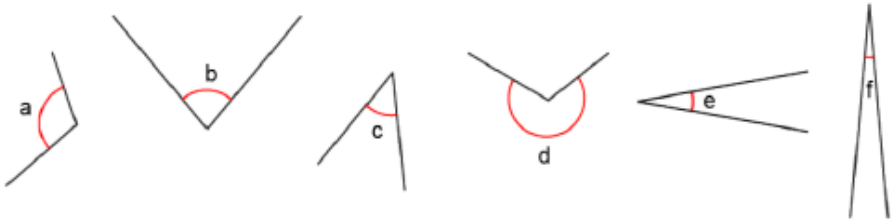






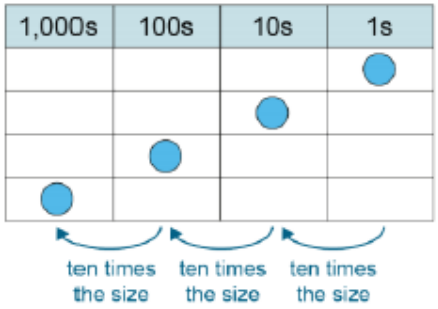


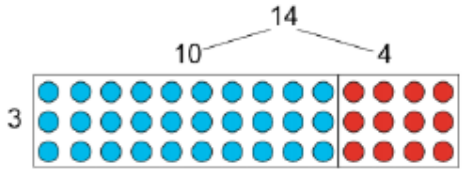


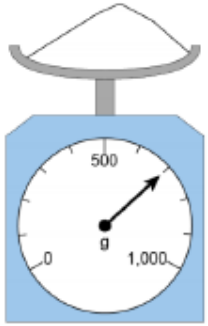


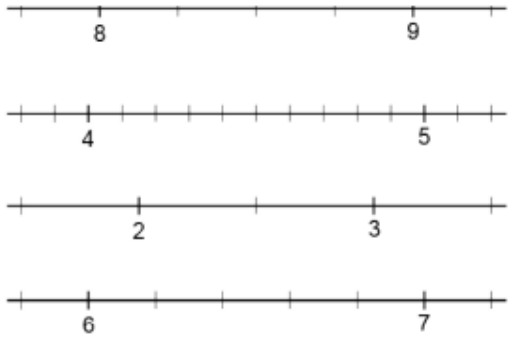
Visual coding: key representations

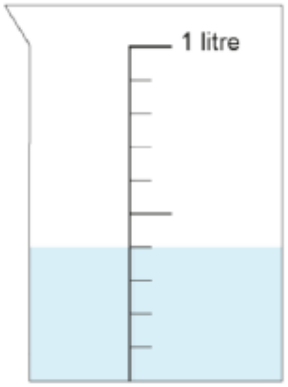
Year 5: 5.5

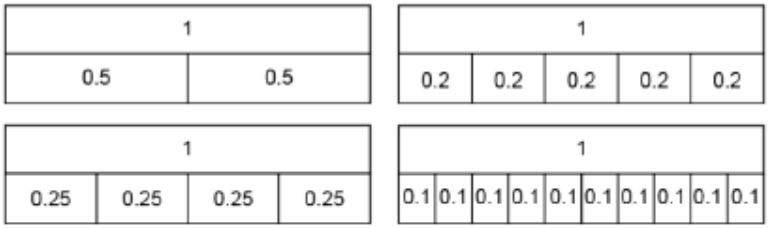






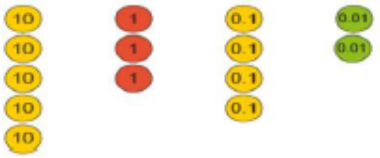


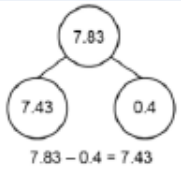


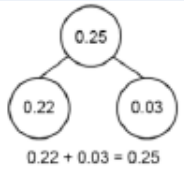


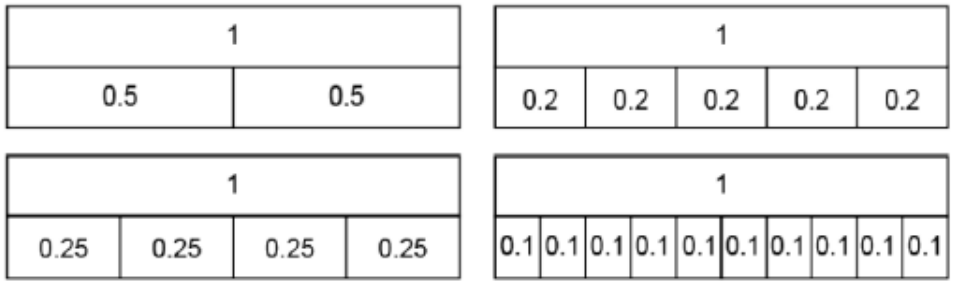
Visual coding: key representations

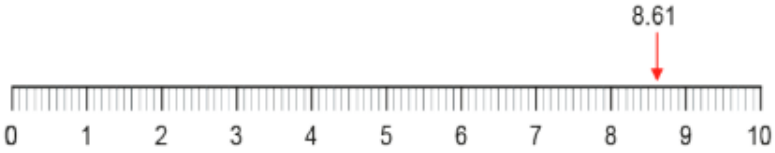
Year 6: 6.1

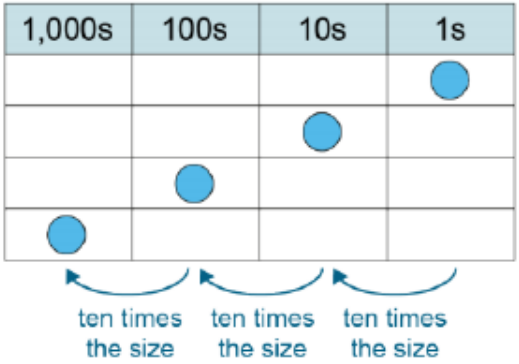


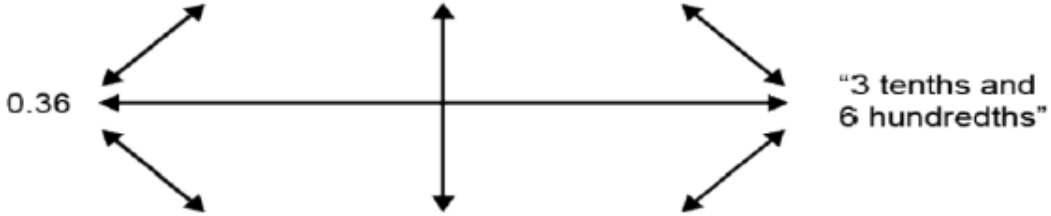








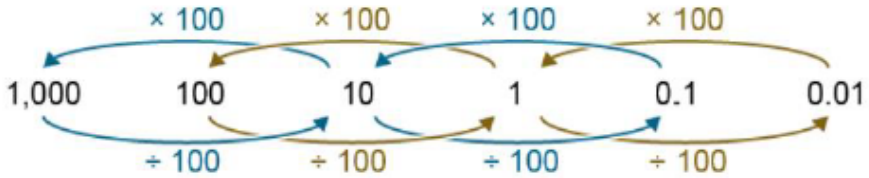




1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09

Visual coding: key representations

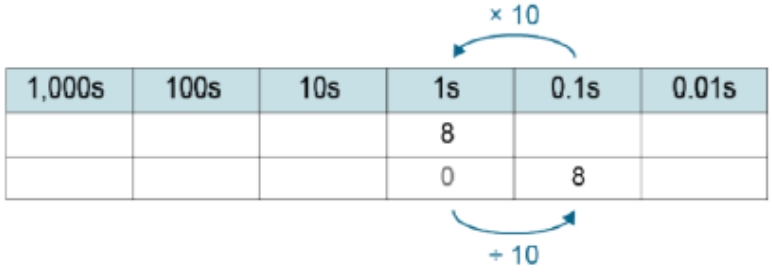
Year 6: 6.2



1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09

× 10 ÷ 10

8 ÷ 10 = 0.8 0.8 × 10 = 8



8 ÷ 10 = 0.8 0.8 × 10 = 8

Informal written method	Expanded multiplication algorithm	Short multiplication
34×2 = 30×2 + 4×2 = 60 + 8 = 68	10s 1s 3 4 × 2 8 (2 × 4 ones = 8 ones) 6 0 (2 × 3 tens = 6 tens) 6 8	10s 1s 3 4 × 2 6 8

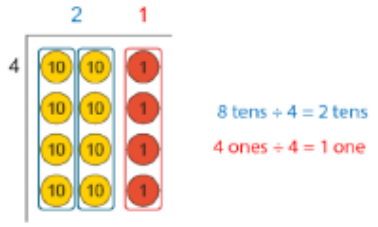
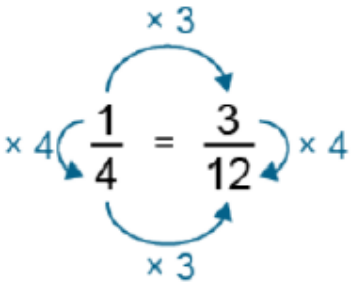
Short division with place-value counters	Short division
	10s 1s 2 1 4 | 8 4

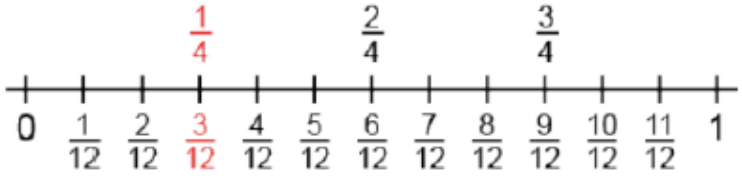
Figure 29: dividing 84 by 4 using short division with place-value counters

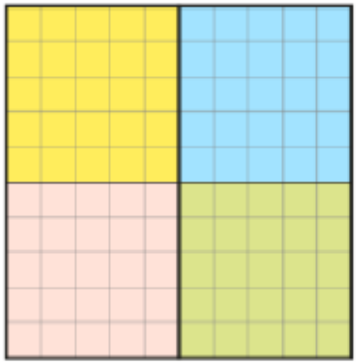
Figure 30: dividing 84 by 4 using short division with place-value headings

Visual coding: key representations

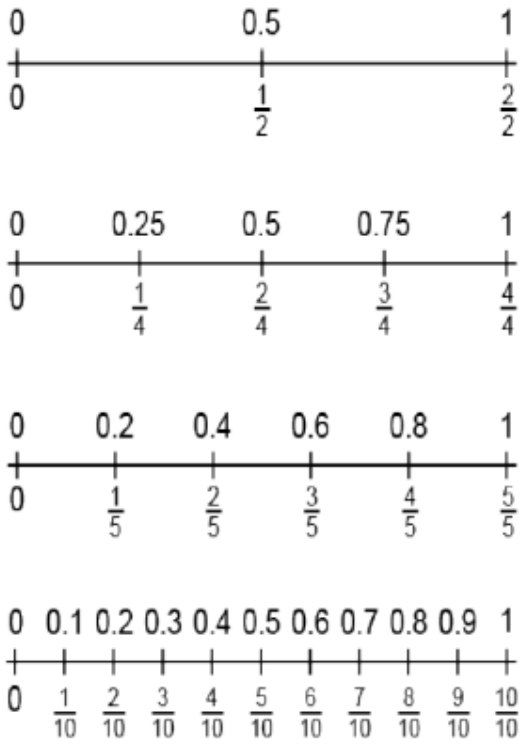
Year 6: 6.3

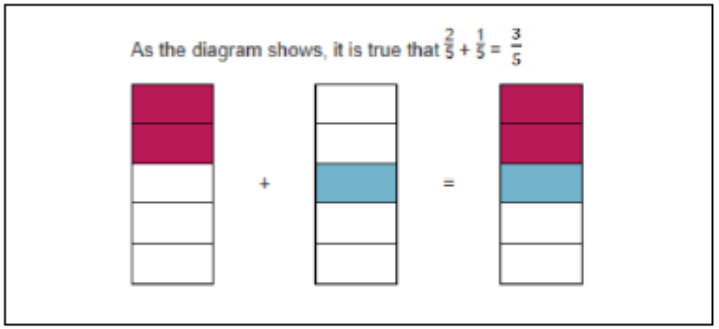






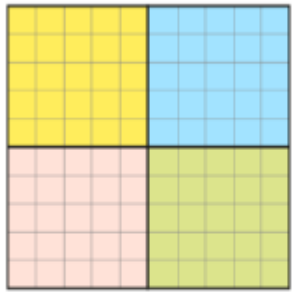
$^1/_4 = 25\%$





Visual coding: key representations

Year 6: 6.4



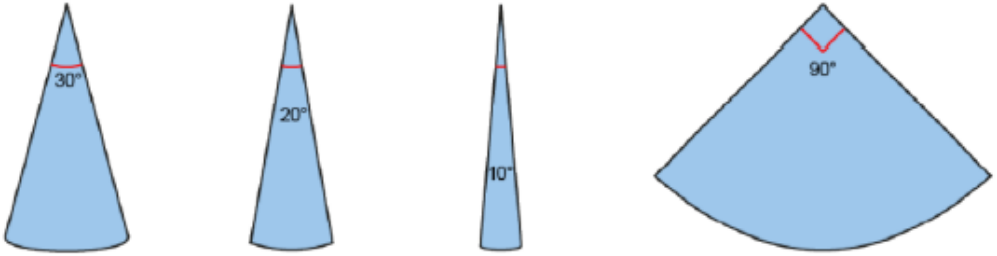
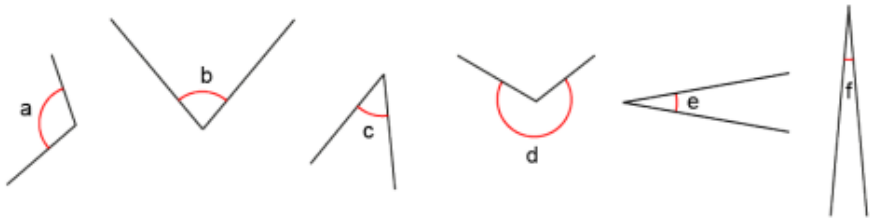


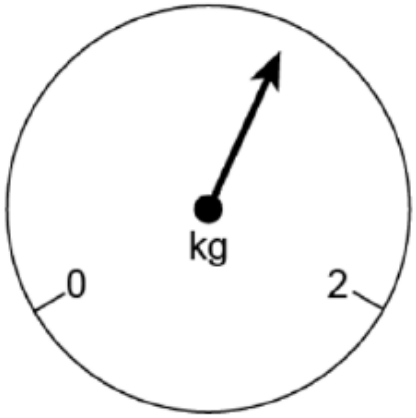
Figure 45: a selection of 'standard angle' measuring tools

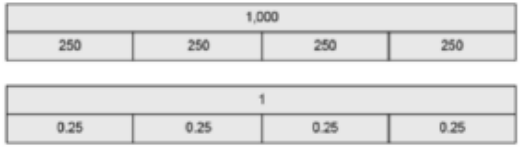


1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09

Year 6: 6.5

Distance in km expressed as a fraction	Distance in km expressed as a decimal fraction	Distance in metres
$\frac{1}{5}$km	0.2km	200m
$\frac{1}{4}$km	0.25km	250m
$\frac{1}{2}$km	0.5km	500m
$\frac{3}{4}$km	0.75m	750m
$\frac{1}{10}$km	0.1km	100m
all other multiples of $\frac{1}{10}$km, for example, $\frac{7}{10}$km	0.7km	700m





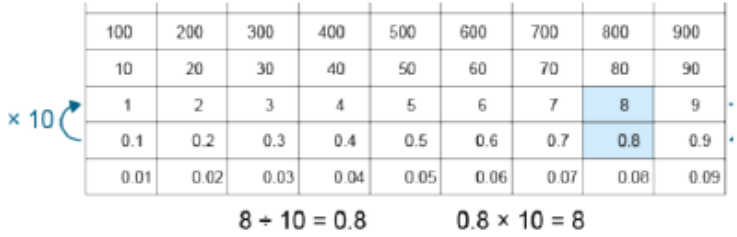


Figure 25: using the Gattegno chart to multiply and divide by 10, crossin