



Developing the Essential Strategies for Computational Fluency

PROFESSIONAL DEVELOPMENT
www.origoeducation.com

James Burnett, M.Ed.

ORIGO[®]
EDUCATION



This or That Again?

Round	Player One	Player Two	Player Three
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Materials: 3 standard dice

Computational Fluency

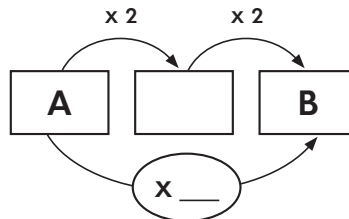
develops from:

- Number sense activities
- Connections built through algebraic experiences
- Visual aids and models
- Appropriate games

Provide open input

13

Look at this arrow chart.



1. What number should appear in Box A, if
 - a. 18 is placed in Box B?
 - b. 42 is placed in Box B?
 - c. 26 is placed in Box B?
 - d. 34 is placed in Box B?
2. What number should appear in the oval?

Computation and Number Sense

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8

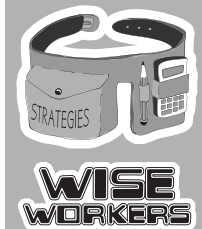
Copy and complete each of these. Write a number **greater than one** in each box

- a. x 25 x 6 = ____
- b. 5 x 12 x = ____
- c. 7 x x 4 = ____
- d. x 24 x 2 = ____

Computation and Number Sense

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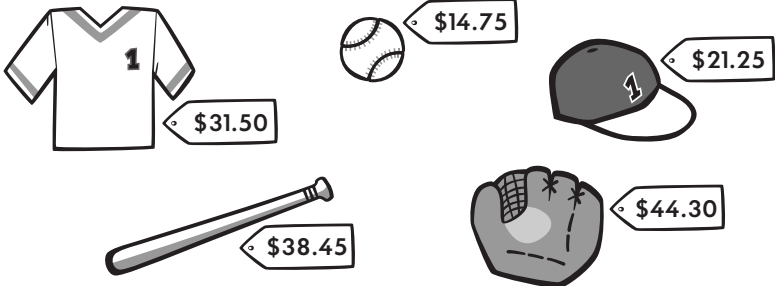
Green Tank



Are embedded in context

20

Baseball Bargains!



How much change would you receive from **\$50** if you bought

- the shirt?
- the glove?
- the bat?
- the ball and cap?

Computation and Number Sense © ORIGO Publications



**QUICK
THINKERS**

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3

Rewrite the story below using each of these numbers only once. Your story must make sense.

1.95 7.80 4

10 2.20

Gemma bought ____ ice cream cones. She paid \$____ each. The total cost was \$____. She received \$____ change from \$____.

Computation and Number Sense © ORIGO Publications



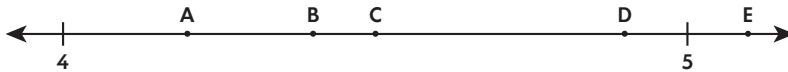
**NUMBER
JUGGLERS**

Red Tank

Use multiple models for number – relative position

17

Look at this number line.



What numbers could be **located** at points A, B, C, D, and E?

Computation and Number Sense

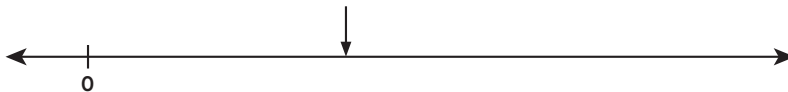
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Green Tank



1

Trace this number line onto another sheet of paper.



If the arrow is pointing to **50**, mark where you think these numbers are **located**.

- a. 65
- b. 100
- c. 10
- d. 45
- e. 110

Computation and Number Sense

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Green Tank



Use multiple models for number – place value

18

Look at these digits.

2 7 3 5

Use each digit only once. Write

- the **greatest** (biggest) odd number possible.
- the **least** (smallest) even number possible.
- two numbers that are **close to 5,300**.
- two numbers that have a **difference of 9**.

Computation and Number Sense

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Red Tank

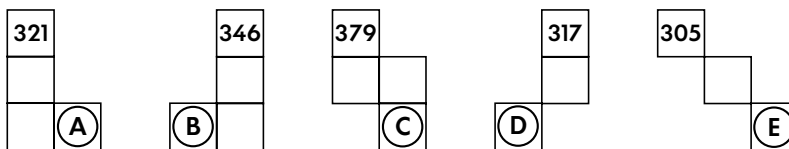


2

Here is a **chunk** of a hundred chart.

301	302	303	304	305	306	307	308	309	310
311	312	313	314	315	316	317	318	319	320

Here are some **pieces** of the same chart.



Write the numbers that belong at A, B, C, D, and E.

Computation and Number Sense

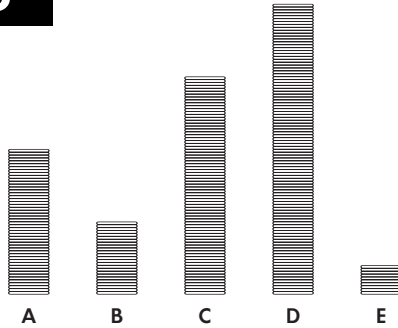
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Green Tank



Involve estimation

13



Stack A has 50 coins.

- Estimate the number of coins in each stack.
- If each coin is **10 cents**, what is the value of each stack?
- If each coin is **5 cents**, what is the value of each stack?
- How did you figure out the answers to **Question C**?

Computation and Number Sense

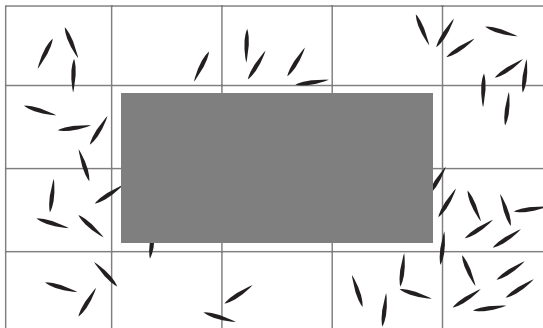
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Green Tank



1

These seeds are spread fairly evenly over a grid.
Part of the grid has been covered.



- Estimate the **total number** of seeds on the grid.
- Write how you made your estimate.

Computation and Number Sense

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Green Tank



Take or Tally

Player 1

Player 2

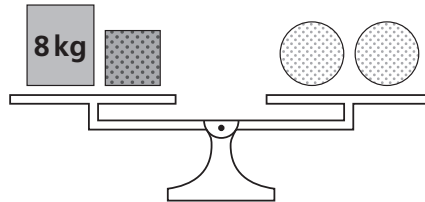
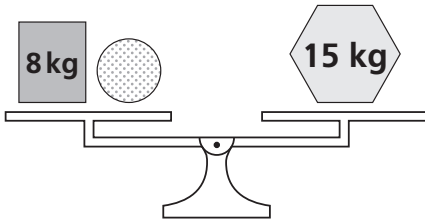
$13 - \underline{\quad} = \underline{\quad}$	$13 - \underline{\quad} = \underline{\quad}$
$12 - \underline{\quad} = \underline{\quad}$	$12 - \underline{\quad} = \underline{\quad}$
$11 - \underline{\quad} = \underline{\quad}$	$11 - \underline{\quad} = \underline{\quad}$
$10 - \underline{\quad} = \underline{\quad}$	$10 - \underline{\quad} = \underline{\quad}$
$9 - \underline{\quad} = \underline{\quad}$	$9 - \underline{\quad} = \underline{\quad}$
$8 - \underline{\quad} = \underline{\quad}$	$8 - \underline{\quad} = \underline{\quad}$
Tally	Tally

Cube A: 1, 2, 3, 1, 2, 3

Cube B: 7, 8, 9, 10, 11, 12

18

Same shapes weigh the same.



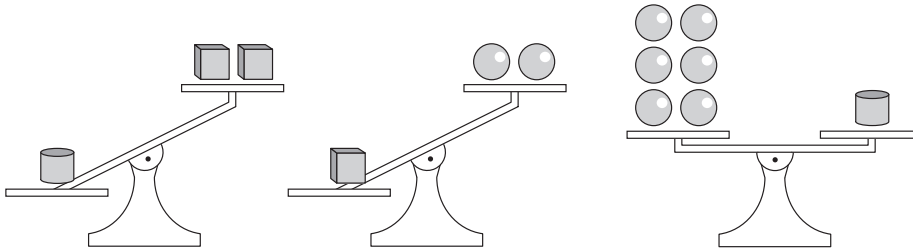
$$\text{Dotted Circle} = \underline{\quad} \text{ kg}$$


$$\text{Dotted Square} = \underline{\quad} \text{ kg}$$





17

Each shape is a whole number of kilograms.



 = 12 kg

a.  = ____ kg

b.  = ____ kg

Thinking Mathematically and Problem Solving

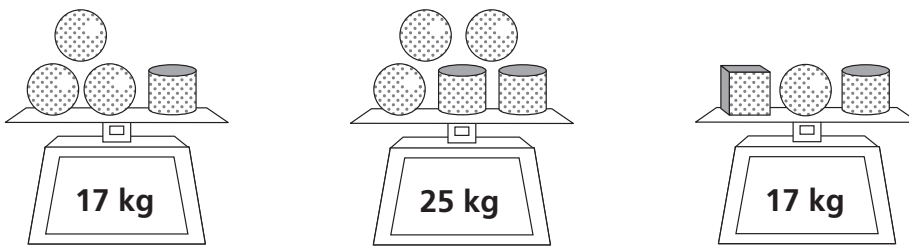
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Prickly Problems


Purple Tank


17



Same shapes are the same number of kilograms.

a.  = ____ kg

b.  = ____ kg

c.  = ____ kg

Thinking Mathematically and Problem Solving

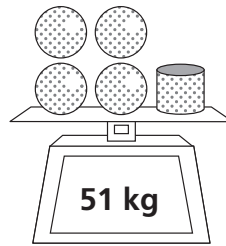
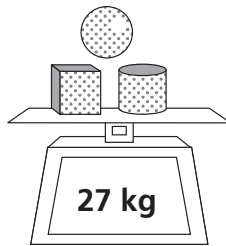
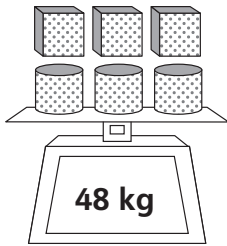
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MENTAL MATTERS

Green Tank

5



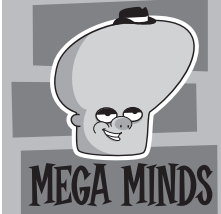
Same shapes are the same number of kilograms.

- a.  = ____ kg
- b.  = ____ kg
- c.  = ____ kg

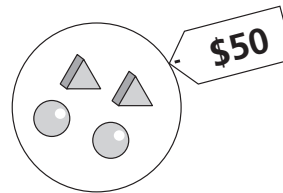
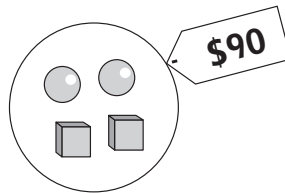
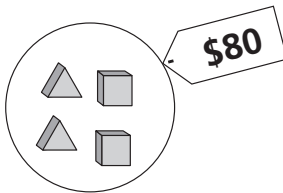
Thinking Mathematically and Problem Solving

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Red Tank



17



Same shapes are the same price.

- a.  \$ _____
- b.  \$ _____
- c.  \$ _____

Thinking Mathematically and Problem Solving

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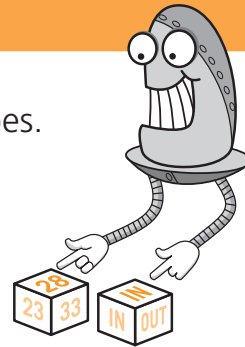
Blue Tank



Writing Input and Output Numbers

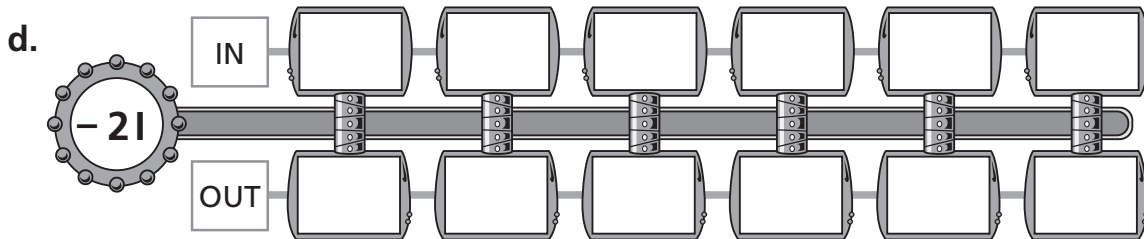
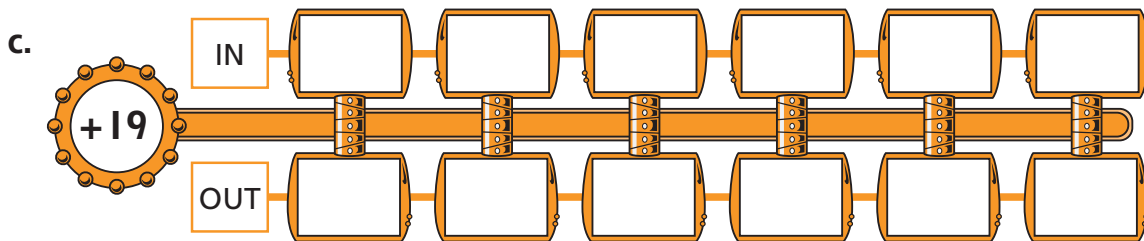
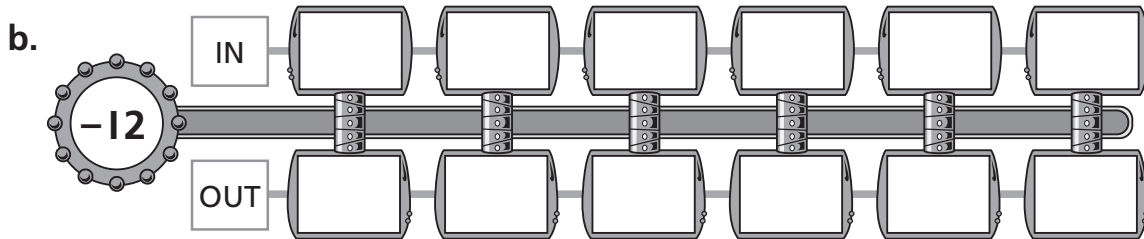
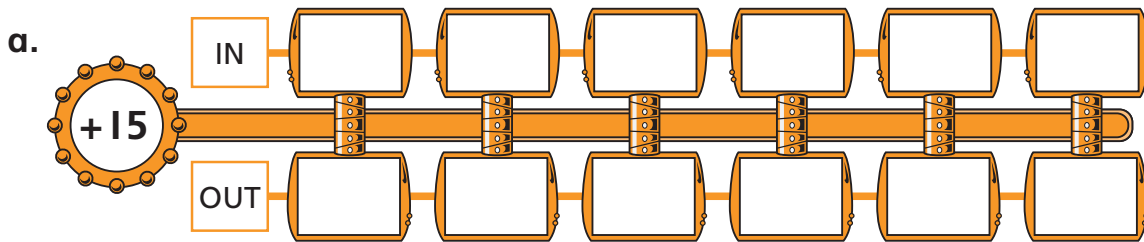
Write these numbers and words on the faces of two cubes.

Cube 1 –	23	28	33	37	44	56
Cube 2 –	IN	IN	IN	OUT	OUT	OUT

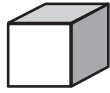


If you rolled this, you would write 28 in the top row.

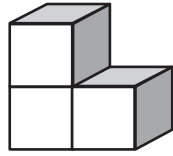
Roll both cubes. Write the number from the roll of Cube 1 in the row that matches the roll of Cube 2. Then use the rule to figure out and write the number that should be in the other row.



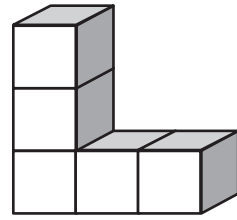
Draw another set of IN and OUT rows and write a new rule. Play the game again.



Building 1



Building 2



Building 3



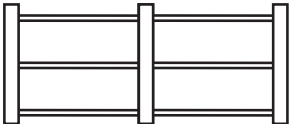
What does the 8th building look like?

How high is the building with 10 blocks along the base?

How many blocks are there altogether in that building?




Which building has a total of ____ blocks?

Relationship patterns

	Number of posts	Number of rails
	1	0
	2	
	3	
	4	

How many rails will be required for 12 posts?

How many rails will be required for 50 posts?

	Number of squares	Number of matches
	1	4
	2	7
	3	
	4	

How many matches will be required to make 10 squares?

How many matches will be required to make 50 squares?

Write in words how to work out the number of matches required to make any number of squares.

Number Fact Strategies

Addition

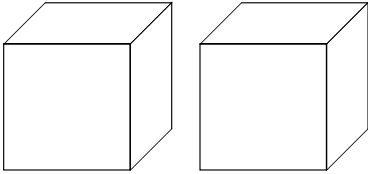
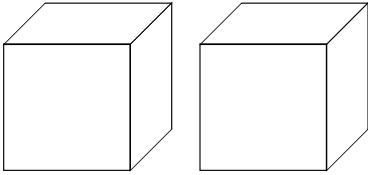
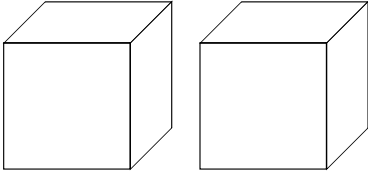
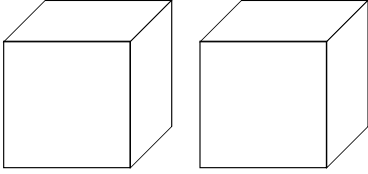
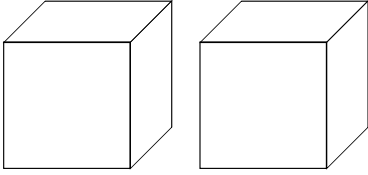
- Count-on 1, 2 and 0
- Doubles and near doubles
- Bridge to ten

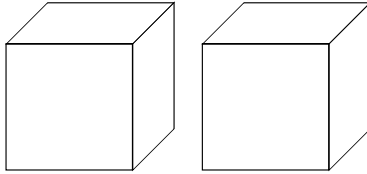
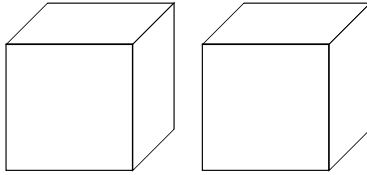
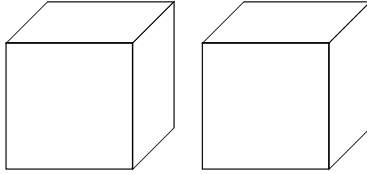
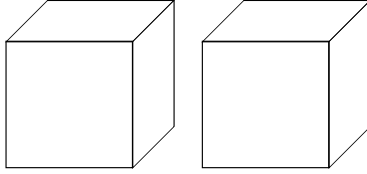
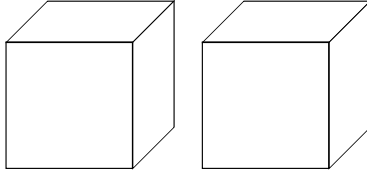
Multiplication







- Use tens (5s)
- Make generalisations (1s and 0s)
- Use doubles (2s, 4s and 8s)
- Build up/down (9s and 6s)

Reinforce

- Roll your number cubes and count on 1 or 2.
- Find your answer below.
- Write your numbers on the number cubes. Write the number fact.

 ___ + ___ = 11
 ___ + ___ = 5
 ___ + ___ = 9
 ___ + ___ = 8
 ___ + ___ = 7

 ___ + ___ = 6
 ___ + ___ = 8
 ___ + ___ = 7
 ___ + ___ = 6
 ___ + ___ = 10

Cube A: 4, 5, 6, 7, 8, 9
Cube B: , , , , , 

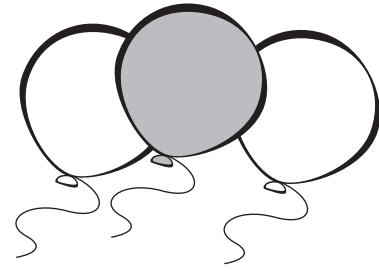
Addition Chart

+	0	1	2	3	4	5	6	7	8	9
0	0	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9	10
2	2	3	4	5	6	7	8	9	10	11
3	3	4	5	6	7	8	9	10	11	12
4	4	5	6	7	8	9	10	11	12	13
5	5	6	7	8	9	10	11	12	13	14
6	6	7	8	9	10	11	12	13	14	15
7	7	8	9	10	11	12	13	14	15	16
8	8	9	10	11	12	13	14	15	16	17
9	9	10	11	12	13	14	15	16	17	18

11	19	13	15
13	9	17	19
17	11	15	9

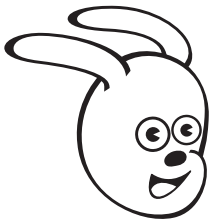
Cube: 4, 5, 6, 7, 8, 9

Jade had 9 girls and 6 boys at her party.
How many guests in all?

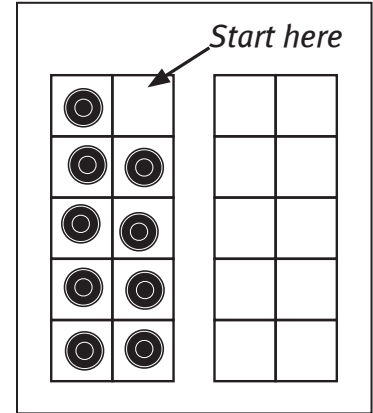


1. a. These ten-frames show 9 counters.
Draw 6 more counters.

b. Write the total. _____



What did you notice?

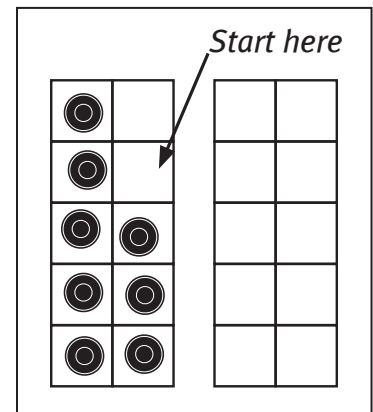


c. Complete the sentence.

$9 + 6$ is the same as $10 +$ _____

2. a. These ten-frames show 8.
Draw 4 more counters.

b. Write the total. _____



c. Complete the sentence.

$8 + 4$ is the same as $10 +$ _____

1. Draw more counters then complete the sentence.

a. Draw 7 more

●			
●	●		
●	●		
●	●		
●	●		

$\overset{9}{\text{---}} + \text{---}$
is the same as
 $\overset{10}{\text{---}} + \text{---} = \text{---}$

b. Draw 5 more

●			
●	●		
●	●		
●	●		
●	●		

$\overset{9}{\text{---}} + \text{---}$
is the same as
 $\overset{10}{\text{---}} + \text{---} = \text{---}$

c. Draw 5 more

●			
●			
●	●		
●	●		
●	●		

$\text{---} + \text{---}$
is the same as
 $\text{---} + \text{---} = \text{---}$

d. Draw 3 more

●			
●			
●	●		
●	●		
●	●		

$\text{---} + \text{---}$
is the same as
 $\text{---} + \text{---} = \text{---}$

2. For each of these, draw an arrow to a number sentence below that has the same answer. Write the answer.

a. $9 + 8$

b. $8 + 6$

c. $9 + 3$

$10 + 2 = \text{---}$

$10 + 7 = \text{---}$

$10 + 4 = \text{---}$

- Roll your number cubes and write the fact below the example in the grid that will help you figure out the answer.
- Write the answer to both facts.

$10 + 6 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$	$10 + 6 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$
$10 + 5 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$	$10 + 5 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$
$10 + 5 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$	$10 + 5 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$
$10 + 4 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$	$10 + 4 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$
$10 + 4 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$	$10 + 4 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$
$10 + 3 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$	$10 + 3 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$
$10 + 3 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$	$10 + 3 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$
$10 + 2 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$	$10 + 2 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$
$10 + 1 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$	$10 + 1 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$

Cube A: 8, 8, 8, 9, 9, 9
Cube B: 3, 4, 5, 5, 6, 7

High or Low

Lana	Skye	Lance
50	50	50
68	50	50
68	50	50
58	40	50

50								50





sample

Round	Players	Aim	Kept Numbers	Second Roll	Total
1	Lana	High	6	4	18
	Skye	High	5	2	15
	Lance	Low	2	3	10

Round	Players	Aim	Kept Numbers	Second Roll	Total
1					
2					
3					

Materials: 4 standard dice

Cat and Mice

5		1		5		1
4	3	2	3	4	3	2
2	1	3	1	2	1	3
1	4	2	5	3	4	1
2	1	3	1	2	1	3
4	1	2	3	4	1	4
2	3	1		5	3	2
1 HOME	4 HOME	2 HOME	3 HOME	2 HOME	4 HOME	1 HOME

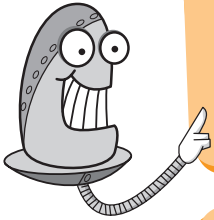
Materials: 2 standard dice

Using Tens to Multiply by 5

Write the answer to the tens number fact.

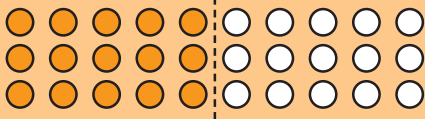
Color half the picture and then write a number fact to match what you colored.

The first one has been colored for you!



a.

$$3 \times 10 = \underline{\quad}$$



$$3 \times 5 = \underline{\quad}$$

b.

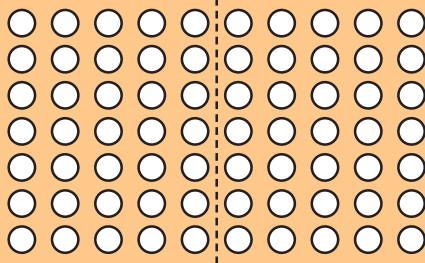
$$2 \times 10 = \underline{\quad}$$



$$2 \times 5 = \underline{\quad}$$

c.

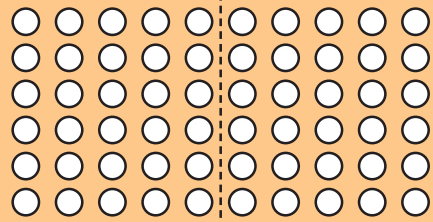
$$7 \times 10 = \underline{\quad}$$



$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

d.

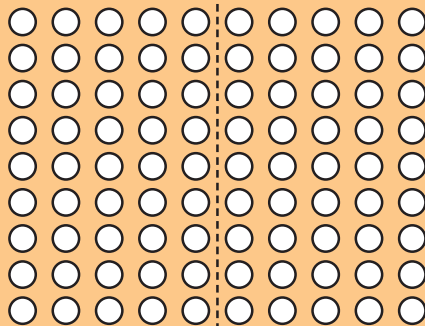
$$6 \times 10 = \underline{\quad}$$



$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

e.

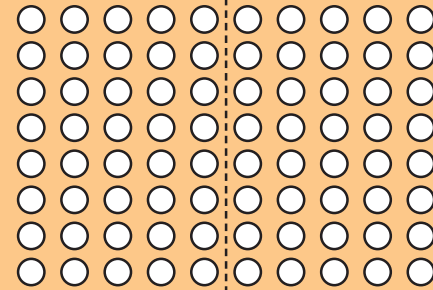
$$9 \times 10 = \underline{\quad}$$



$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

f.

$$8 \times 10 = \underline{\quad}$$



$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$



Write a tens fact you could use to work out each of these:

- a. $4 \times 5 = \underline{\quad}$ b. $12 \times 5 = \underline{\quad}$ c. $16 \times 5 = \underline{\quad}$

Take your Pick

60	70	90	110	120
120	130	140	160	180
180	210	220	240	240
260	270	290	320	320
360	420	480	540	580

Number of Rounds

Nice and Easy

30×3	50×3	70×3	90×3
30×4	50×4	70×4	90×4
30×6	50×6	70×6	90×6
30×7	50×7	70×7	90×7
30×8	50×8	70×8	90×8
30×9	50×9	70×9	90×9

Cube A: 15, 15, 25, 35, 45, 45
Cube B: 6, 8, 12, 14, 16, 18

Nice and Easy Too!

90	150	210	270
120	200	280	360
180	300	420	540
210	350	490	630
240	400	560	720
270	450	630	810

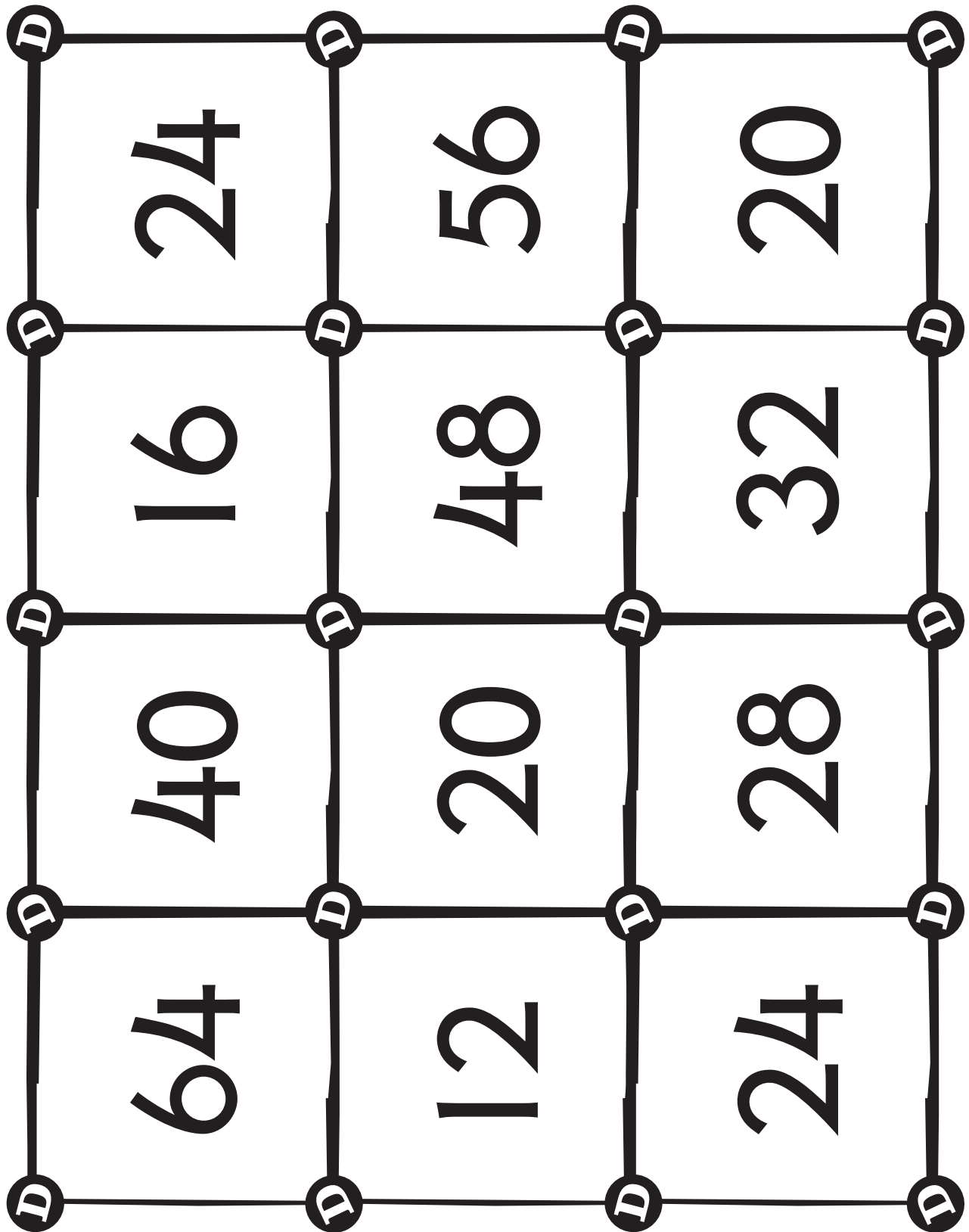
Multiplication Chart

X	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9
2	0	2	4	6	8	10	12	14	16	18
3	0	3	6	9	12	15	18	21	24	27
4	0	4	8	12	16	20	24	28	32	36
5	0	5	10	15	20	25	30	35	40	45
6	0	6	12	18	24	30	36	42	48	54
7	0	7	14	21	28	35	42	49	56	63
8	0	8	16	24	32	40	48	56	64	72
9	0	9	18	27	36	45	54	63	72	81

Times Tussle

20	50	25	50	10	30
70	30	10	90	45	80
35	40	25	40	15	45
80	15	50	100	90	35
45	25	20	40	50	100
45	25	30	20	30	15
70	60	35	60	20	40

Do the Ds



Build Up/Build Down Again!

54	12	24	36
18	63	81	42
27	48	54	30
45	72	36	18

X Zone

Player One

25	30	35	40	45	50	55	60	65	70	75	80
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Strike Out

Player Two

80	75	70	65	60	55	50	45	40	35	30	25
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Strike Out

Does it Divide?

Wild	702	412	105	102	Wild
165	312	891	531	138	425
246	405	248	426	105	423
428	216	411	303	342	502
108	120	128	642	354	261
234	207	312	132	171	351
412	315	144	123	225	322
240	105	540	333	168	330
515	243	228	273	351	345
Wild	196	561	104	316	Wild