

Missions

Six projects to build, plus warm-ups, games and puzzles

THIS BOOK BELONGS TO

Colour a badge in each time you finish a mission



Bug Hotel
Sheets 13–17



The Shop
Sheets 18–22



Weather Watcher
Sheets 23–27



Map My World
Sheets 28–31



The Machine
Sheets 32–35



Story Studio
Sheets 36–39



Warm-ups
Sheets 1–12. Short pages that keep the important things sharp. There's a new secret picture on sheet 1.



Games & puzzles
Sheets 40–45. Things to play, and puzzles that are meant to be hard.

How the missions work
Each mission has 4 or 5 steps, and each step is one page. One step a day is plenty. You do not have to finish a mission in one go — or at all. You can stop between any two steps and come back whenever you like. The page will wait for you.

For the grown-up The warm-ups deliberately revisit the highest-leverage Grade 2 skills — addition facts to 20, flexing vowel sounds, multiplication and division, the equals sign, the ruler — several weeks after Volume 1 covered them. That gap is the point: spaced practice sticks far better than repetition. The missions each braid maths, science, writing and art into one thing she actually makes, so they're best spread over a week.



A new secret picture

Work out every answer. Colour each square using the key. Something is hiding again.

work it out

colour

11 or 12	13, 14 or 15	16 or 17	18, 19 or 20						
2+9	4+9	5+8	3+8	4+7	5+6	6+5	6+7	7+6	7+4
8+5	9+4	10+3	3+10	8+3	9+2	5+9	6+8	7+7	8+6
9+5	10+4	4+10	6+9	9+9	10+8	7+8	8+7	9+6	10+5
10+1	7+9	8+8	5+10	8+10	10+9	4+9	9+7	10+6	1+10
3+9	6+10	8+9	9+8	9+10	10+10	10+7	7+10	7+9	4+8
5+7	6+6	8+8	9+7	9+9	10+8	10+6	6+10	7+5	8+4
9+3	10+2	2+10	8+9	8+10	10+9	9+8	2+9	3+8	4+7
5+6	6+5	7+4	8+3	9+10	10+10	9+2	10+1	1+10	3+9



These are the same 24 facts as the monster picture in your other book — but you have not seen them for a while. That gap is on purpose. Things you remember *after* a gap are the things you really know.

Time yourself: This try The monster took

For the grown-up This is the same fact set as the Volume 1 reveal, met again weeks later — which is exactly what makes it stick. Watch for hesitation rather than error: a fact recalled after a three-second pause is not yet fluent. Note which squares come out the wrong colour, because those are the facts to drill. B2.2



Crack the joke

Work out each answer. Find that number in the key. Write its letter in the coloured box.

work it out

write

Here is how it works

If a box says $4 + 4$, the answer is 8. Look up 8 in the key below — it is H. So you write H in the coloured box.

The key

A=1 B=2 C=3 D=4 E=5 F=6 G=7 H=8 I=9 J=10 K=11 L=12 M=13 N=14 O=15 P=16 Q=17 R=18 S=19 T=20 U=21
V=22 W=23 X=24 Y=25 Z=26

Why was six afraid of seven?

$12 + 7$

$13 - 8$

$14 + 8$

$9 - 4$

$6 + 8$

$10 - 9$

$11 + 9$

$20 - 15$

$25 - 11$

$17 - 8$

$7 + 7$

$2 + 3$

Read your letters in order. The answer is three words.

Did you get it?

The joke works because 8 sounds exactly like ate. A joke that plays with two meanings of a sound is called a pun.

your turn

Make your own code message for someone. Write four calculations whose answers spell a short word.

My secret word is (don't let them see!)

For the grown-up

Codes turn arithmetic into a reason rather than a chore, and this one has a built-in check: a wrong answer produces a letter that makes the word nonsense, so she can self-correct without being told. Puns are also worth naming explicitly — they are the same two-meanings idea as the idiom sheets.

B2.2 · B2.4



Arrays are everywhere

For each picture, count the rows and the columns. Then write the multiplication.

count

write

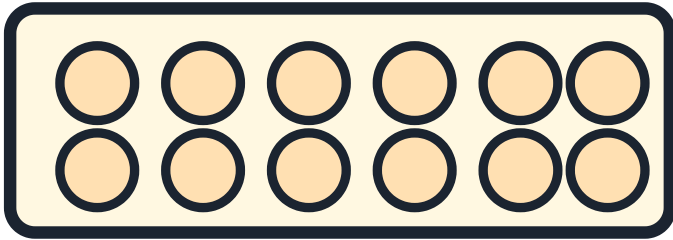
✓ Here is one done for you



2 rows of 5 → $2 \times 5 = 10$

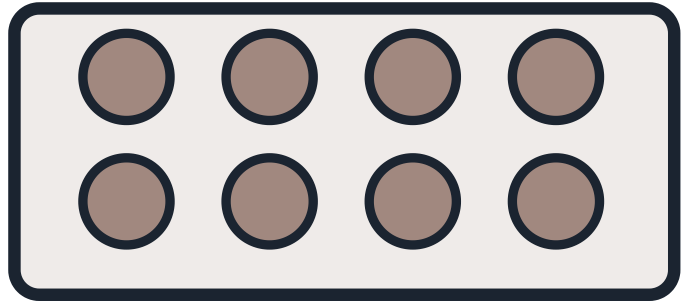
You could also read it the other way: 5 columns of 2, which is $5 \times 2 = 10$. Both are right, and both give 10.

An egg box



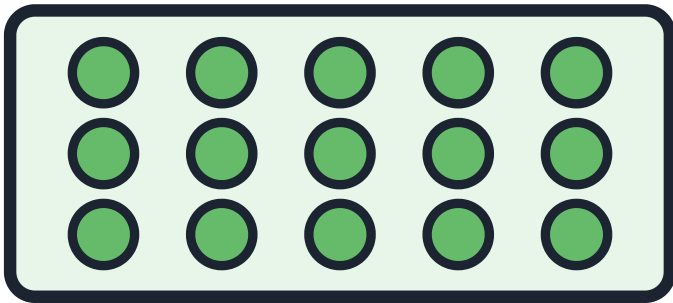
___ rows of ___ · ___ × ___ = ___

A muffin tray



___ rows of ___ · ___ × ___ = ___

A vegetable patch



___ rows of ___ · ___ × ___ = ___

A window



___ rows of ___ · ___ × ___ = ___

Same total, different arrays

There are 12 counters. Draw three different arrays that all use exactly 12.



___ × ___ = 12



___ × ___ = 12



___ × ___ = 12



Tricky

Could you make a neat rectangle array out of 7 counters? Try it and see why.

For the grown-up Egg boxes, muffin trays and window panes are the reason arrays are worth knowing — they are genuinely everywhere once you look. Seven is the interesting one: it only makes 1×7 , so no proper rectangle. That is the first hint of prime numbers, years early. B2.5

Sharing it out

Read each problem. Write how many each person gets, and the division to match.

- 7

count
- write

The problem	Each one gets	The division
12 cookies onto 4 plates		$12 \div 4 = \underline{\hspace{1cm}}$
15 pencils into 5 pots		$\underline{\hspace{1cm}} \div \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$
18 stickers between 3 children		$\underline{\hspace{1cm}} \div \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$
20 socks made into pairs		$\underline{\hspace{1cm}} \div \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$
16 crayons into 4 boxes		$\underline{\hspace{1cm}} \div \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$
10 apples between 2 bags		$\underline{\hspace{1cm}} \div \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$

Every division has a multiplication twin

Fill in both. Notice the same three numbers appear each time.

$15 \div 5 = \underline{\hspace{1cm}}$
so
 $5 \times \underline{\hspace{1cm}} = 15$

$18 \div 3 = \underline{\hspace{1cm}}$
so
 $3 \times \underline{\hspace{1cm}} = 18$

$16 \div 4 = \underline{\hspace{1cm}}$
so
 $4 \times \underline{\hspace{1cm}} = 16$

$20 \div 2 = \underline{\hspace{1cm}}$
so
 $2 \times \underline{\hspace{1cm}} = 20$

This is why learning one fact gives you two for free.

☆ Leftovers again

Not everything shares out neatly. Fill in both parts.

13 apples into 4 bags → $\underline{\hspace{1cm}}$ in each bag, $\underline{\hspace{1cm}}$ left over

17 marbles between 5 friends → $\underline{\hspace{1cm}}$ each, $\underline{\hspace{1cm}}$ left over

11 pencils into 2 pots → $\underline{\hspace{1cm}}$ in each, $\underline{\hspace{1cm}}$ left over

Which of these could you share out completely fairly if you were allowed to cut things in half? $\underline{\hspace{2cm}}$

Try this at snack time for real. Count out the pieces, share them onto plates one at a time, and see what's left. Doing it with your hands is what makes the number sentence make sense.

For the grown-up

The multiplication-twin section is the highest-value part — it halves how much has to be learned in Grade 3. Eleven shared by two is the neat one for the last question: five and a half each, which links straight back to the fair-shares work.

B2.6 · B2.1

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Try it, then flex it – round two

Read each word. Ask yourself: is that a real word? If not, try the other sound.

read out loud

write

☒ A reminder of how it goes

The word is meadow. Try 1: ea usually says /ē/, so I read "mee-dow". Is that a real word? No. Flex it: ea can also say /e/, so I read meadow. Yes! Done.

Letters with more than one sound

ea = /ē/ or /e/

ow = /ō/ or /ow/

oo = long or short

c = /k/ or /s/

g = /g/ or /j/

ch = /ch/ or /k/

y = /i/ or /ē/

o = /o/ or /u/

Word	My first try	Real word?	Flexed to...
gown			
gentle			
circle			
chemist			
sweater			
money			
jolly			

Words that need two flexes

These are harder. Both the tricky letters need thinking about.

cycle → the first c says and the y says

gigantic → the first g says and the second says

December → the c says and the es say

A useful pattern to notice: c and g usually go soft (/s/ and /j/) when the next letter is e, i or y.

For the grown-up The soft c and g rule is worth stating plainly because it explains a huge number of words at a stroke. Keep asking "Is that a real word?" until she asks it unprompted — that self-check is the whole skill, and it is what separates a reader from a decoder. B2.1



Really long words

Draw lines between the parts. Then read each word one part at a time.

write

read out loud

✓ The finger trick, and then chopping

Step 1. If the word ends in a chunk you know — tion, ture, ing, ful, able — cover it with your finger first.

Step 2. Chop what's left between the consonants. Step 3. Read the parts, then uncover the ending.

c e l e b r a | t i o n → cel | e | bra | tion

Your turn. Some have three parts, some four.

c a l e n d a r

v e g e t a b l e

t o m a t o

i n t e r e s t i n g

a d v e n t u r e

i n v i s i b l e

e l e c t r i c

i m a g i n a t i o n

How many parts?

Hand under your chin. Count the jaw drops.

calendar

adventure

tomato

invisible

electric

interesting

imagination

hippopotamus

Find the longest word you can

Look through a book you are reading. Find the longest word on any page. Write it here, chop it into parts, and read it.

.....
.....

It has parts. Was it easier once you chopped it?

For the grown-up Long words are much less frightening than they look once a child has a reliable method, and the method is what this page is really teaching. *Imagination* and *hippopotamus* are both five parts and both feel like a triumph.

B2 · orthographic knowledge



Balance it again

Work out both sides. Then write the number that makes them the same.

7 work it out

write

Remember what = means

It means the same as. It does not mean "the answer comes next."

For $7 + 8 = 6 + \square$: work out the left side first. $7 + 8 = 15$. So the right side must also make 15. And $6 + 9 = 15$. So the answer is 9.

$$7 + 8 = 6 + \square$$

$$20 - 4 = 9 + \square$$

$$5 + 5 + 5 = 10 + \square$$

$$12 + 6 = \square + 9$$

$$30 + 40 = 50 + \square$$

$$100 - 25 = 50 + \square$$

True or false?

Write T or F. Careful with the last one.

$$8 + 7 = 15 \text{}$$

$$9 + 6 = 14 \text{}$$

$$20 - 5 = 10 + 5 \text{}$$

$$6 + 6 = 12 + 0 \text{}$$

$$4 + 8 = 3 + 8 \text{}$$

$$15 = 7 + 8 \text{}$$



The last one surprises a lot of people. $15 = 7 + 8$ is completely true! The answer is allowed to be on the left. Both sides are 15, and that is all the equals sign cares about.

Make your own

Write two balances with a missing number, then give them to a grown-up to solve.

For the grown-up If she writes 15 in the first box, she is reading = as an instruction rather than a relationship — go back to a balance scale picture. The final true-or-false item matters more than it looks: children who only ever see the answer on the right find $15 = 7 + 8$ genuinely startling.

C2.2 · C2.3



Big numbers, in pieces

Fill in each row of the table. The first row is done for you.

write

Number	Hundreds	Tens	Ones	Written in pieces
183	1	8	3	$100 + 80 + 3$
146				
109				
170				
	1	9	5	
				$100 + 20 + 7$
	2	0	0	

Jumping about

Start at	10 more	10 less	100 more	100 less
146				
92				
105				

One of these has a tricky answer. Which one, and why?

Which digit is worth the most?

In each number, circle the digit that is worth the biggest amount — not the digit that *looks* biggest.

192

128

119

183

In 192, the 9 looks biggest but the 1 is worth 100. Where a digit sits decides what it is worth.

☆ Mystery numbers

I am between 150 and 160. I am odd. My digits add up to 11. I am

I have 1 hundred. My tens digit is double my ones digit. My ones digit is 4. I am

I am 20 more than 175. I am I am 100 less than 200. I am

For the grown-up Starting at 92 is the tricky row: 10 more crosses into three digits, and 100 less would go below zero, so the honest answer is "you can't with the numbers we know yet." That is a perfectly good answer and worth praising rather than fudging.

B1.1 • B1.2



The trading maze

Check every sum. Colour the ones that are correct. They make a path.

7 check each one

colour

How to check quickly

Do the ones column first. If $27 + 15$ is claimed to be 32, look at $7 + 5 = 12$ — the answer must end in 2, so 32 is possible and you need to check the tens too. But if the answer ended in 3, you would know instantly it was wrong.

The path starts at the top-left and ends at the bottom-right. It only moves up, down, left or right — never diagonally.

$27 + 15$ = 42	$38 + 24$ = 62	$34 + 28$ = 52	$52 + 19$ = 61	$63 + 28$ = 81	$41 - 17$ = 34
$75 - 38$ = 47	$45 + 27$ = 72	$26 + 37$ = 53	$84 - 29$ = 65	$58 + 25$ = 73	$93 - 46$ = 57
$39 + 45$ = 74	$56 + 18$ = 74	$63 - 27$ = 36	$82 - 45$ = 37	$67 - 28$ = 49	$48 + 33$ = 71
$72 - 35$ = 47	$55 + 29$ = 74	$81 - 47$ = 44	$71 - 34$ = 37	$29 + 46$ = 65	$64 - 38$ = 36
$36 + 27$ = 53	$95 - 47$ = 58	$43 + 38$ = 71	$90 - 26$ = 64	$100 - 45$ = 55	$47 + 46$ = 93

Fix the broken ones

Choose three sums you coloured over because they were wrong. Write them out properly here.

Most of the wrong answers on this page are out by exactly 10. That is what happens when you forget to carry, or forget to break a ten open.

For the grown-up Checking somebody else's work is harder than doing your own, and far more useful — it is what proofreading is to writing. The ones-column shortcut is a real strategy: it rules out a wrong answer in one second without doing the whole sum.

B2.4



The ruler, again

Read each length. Careful — most of these do not start at zero.

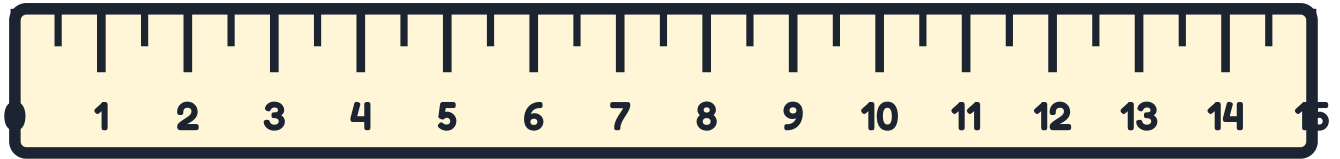
 measure

 write

☒ The rule that catches everyone

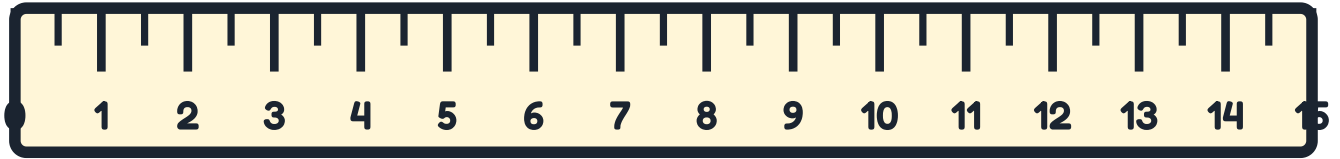
You are measuring the distance, not reading the number at the end. If something goes from 3 to 11, it is 8 cm long, not 11 cm. Take the small number away from the big one.

ribbon



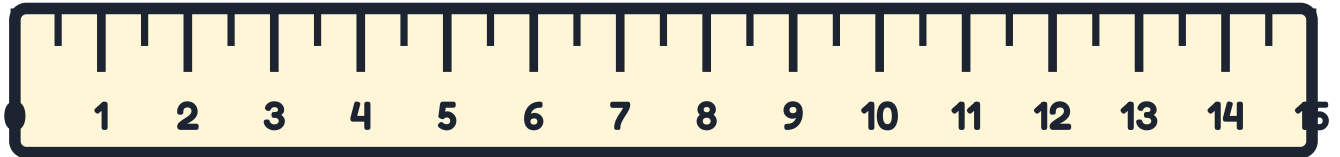
The ribbon goes from to, so it is cm.

straw



The straw goes from to, so it is cm.

twig



The twig goes from to, so it is cm.



Counting backwards

Fill in the missing numbers. These all go down, which is harder than going up.

7 count

write

Down by 10s

150 140 120 100

Down by 5s

100 95 85 75

Down by 2s

120 118 114 110

Down by 25s ☆ hardest

200 150 100

Even and odd, taking away

Last time you found out what happens when you add. Now try subtracting. Do each one three times before you write the rule.

even – even = try: $10 - 4 = \underline{\quad}$ $20 - 6 = \underline{\quad}$ $16 - 8 = \underline{\quad}$

odd – odd = try: $9 - 3 = \underline{\quad}$ $15 - 7 = \underline{\quad}$ $11 - 5 = \underline{\quad}$

even – odd = try: $10 - 3 = \underline{\quad}$ $14 - 5 = \underline{\quad}$ $20 - 7 = \underline{\quad}$

Do you get the same three rules as you did for adding?

Why even and odd is actually useful

You can only split a group into two equal teams if the number is even. Tick the class sizes that would work.

☐ 24 children ☐ 19 children ☐ 30 children ☐ 27 children

If a class has 27 children, what could you fairly do so nobody is left out?

For the grown-up Backwards counting is genuinely harder than forwards and is what subtraction rests on, so it earns its own page. The 25s row is the stretch. And the even/odd subtraction rules turn out identical to the addition ones, which is a satisfying thing to discover rather than be told. B1.4 · B1.5

More phrases that don't mean what they say

For each phrase, write what the words say, then what people actually mean.

-  write
  talk about it

The phrase	What the words say	What people actually mean
"Give me a hand."		
"I'm over the moon."		
"Keep an eye on it."		
"She let the cat out of the bag."		
"We're on the same page."		

Meanings you can use: help me · very happy · watch it carefully · she accidentally told a secret · we understand it the same way

Phrases about time that aren't exact

These ones are worth knowing about, because they sound like they mean an exact time but they never do. Write roughly how long each one really means.

"I'll be there in a second." → really means

"In a minute!" → really means

"Hang on." → really means

"We're leaving soon." → really means

Here is the useful bit. If you need to know the real answer, you can ask: "How many minutes, about?" That is a completely fair question, and most grown-ups will be glad you asked instead of guessing.

Similes you can work out

These use as or like, so they are comparisons. Ask: what is that thing famous for?

as stubborn as a mule → mules are famous for

as slippery as an eel → eels are famous for

as fresh as a daisy → so this means

My running list

Every time you hear a phrase that doesn't mean what it says, write it here. Ask someone what it means and write that too. This list is yours — keep adding to it all year.

The phrase I heard	What it turned out to mean

For the grown-up

The time-phrases section is the part worth doing properly. "In a minute" is one of the most confusing things adults say, and giving her the script "How many minutes, about?" hands her a way to get a real answer rather than guessing. Answering it honestly — "about ten" — is worth the small effort. Keep the running list going; it is more useful than any single sheet.

B2 vocabulary · C1



MISSION ONE

Bug Hotel

Build a real shelter for real insects, then find out who moves in.

Read the four steps. You do not have to start today.

Step 1 Find out what bugs actually need, and which bugs live near you

Step 2 Design your hotel and measure it in centimetres

Step 3 Write your instructions, then build it

Step 4 Watch it for a week and record who visits

One step a day is plenty. Tick each step when you finish it. You can stop between any two steps and come back another day — even a week later. Step 4 takes a whole week on its own, and that is meant to be slow.

What you will need

A container

an old plant pot, a tin, a wooden box, a plastic bottle cut in half, or a stack of bricks

Tools

a ruler, scissors, string, and a grown-up for anything that cuts

Filling

hollow plant stems, bamboo pieces, pine cones, bark, dry leaves, straw, small twigs, corrugated cardboard

Free is fine

Almost everything can be found outside for nothing. Nothing on this list needs buying.

Safety rules for this mission

- ☐ A grown-up does all the cutting
- ☐ Wash your hands after being outside
- ☐ Look at bugs, don't pick them up
- ☐ Don't take anything from a nest



A bug hotel is not a pretend project. Insects really do move into these, and they matter — bees pollinate the plants that make our food, and beetles and woodlice break down dead leaves into soil. You are actually helping.

For the grown-up Spread this over a week or more. Steps 1 to 3 are a session each; step 4 needs daily thirty-second checks across seven days, which is where the data work comes from. The whole mission covers habitats and animal needs, measurement in centimetres, procedural writing, and tally-and-graph data handling.

Science B1 · Maths E2, D1 · Language D1



1

STEP ONE OF FOUR

What do bugs actually need?

Fill in the four things every animal needs. Then go outside and look for bugs.

write

go and look

Every habitat must provide four things

f

w

a

sh

Your bug hotel is really only providing one of these four. Which one?

Different bugs like different materials

Bug	Likes to shelter in	Why that suits it
Solitary bees	hollow stems and tubes	
Ladybirds	dry leaves and hollow stems	
Woodlice	damp bark and rotting wood	
Beetles	gaps between twigs and logs	
Spiders	corners and small dark spaces	

So a good hotel needs different sized spaces, not all the same. Why?

Go and look – a two-minute bug hunt

Look under a stone, in some leaves, on a plant, or on a wall. Look but don't touch. Draw or name what you find.



Found

Where?



Found

Where?



Found

Where?

My decision

The bug I most want to visit my hotel is

So I will definitely include

Was every bug you found an insect? Remember: insects have six legs. Spiders have eight and woodlice have fourteen, so neither is an insect. Which of yours were insects?

.....

For the grown-up Your hotel only provides **shelter** — food, water and air come from the garden around it. That distinction is worth drawing out. The spider-and-woodlouse point revisits the classification work: six legs is the test, and most “bugs” fail it.

Science B1 • B2



2

STEP TWO OF FOUR

Design it and measure it

Measure your container in centimetres. Write the numbers in, then draw your plan.

measure

draw

work it out

My container

How tall? cm

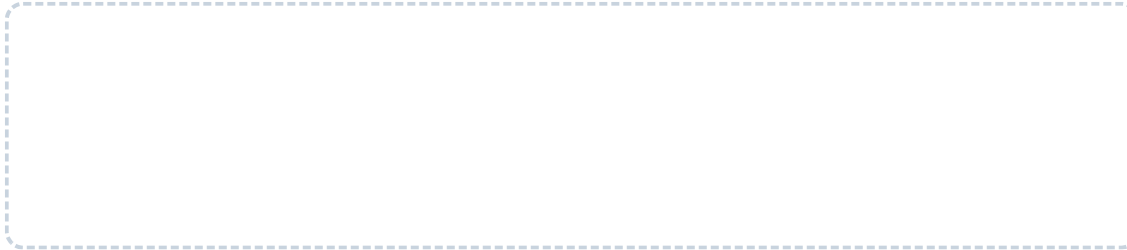
How wide? cm

How deep? cm

What is it?

Start your ruler at 0, right at the edge. If you can't, remember to take the small number away from the big one.

My plan



Draw the front of your hotel. Show where each material goes. Label at least three sections.

Sections

Split your hotel into sections so different bugs get different spaces.

Number of sections:

.....

Section 1 will hold

Section 2 will hold

Section 3 will hold

Section 4 will hold

How many tubes will fit?

This is a real multiplication problem, not a pretend one.

Worked example

My space is 20 cm wide. Each hollow stem is about 2 cm across. So $20 \div 2 = 10$ stems fit in one row.
If I stack 3 rows, that is $3 \times 10 = 30$ stems altogether.

My space is cm wide. Each of my tubes is about cm across.

So $\div$ = tubes fit in one row.

I will have rows, so I need $\times$ = tubes altogether.

Collect your materials

Tick each one off as you find it. You do not need all of them.

☐ hollow stems☐ pine cones☐ bark☐ dry leaves☐ straw☐ small twigs☐ cardboard☐ something else:

For the grown-up

The tube calculation is the best bit of maths in this mission because the answer genuinely matters — get it wrong and you collect the wrong number of stems. Let the estimate be rough; "about 2 cm" is fine and realistic. Division here is being used as measurement rather than sharing, which is a good extension.

Maths E2.2, B2.5, B2.6



3

STEP THREE OF FOUR

Write it, then build it

Write your instructions first. Then follow your own instructions exactly.

write build tick

Order words, and doing words

First Next Then After that Finally

collect cut measure stack push fill tie place

☒ What a good instruction looks like

Good: "First, collect twenty hollow stems about 10 cm long."

Not good enough: "First get some stems."

A good instruction starts with a doing word and says how many or how big.

My instructions

First,

Next,

Then,

After that,

Finally,

Now build it

Follow your own instructions, one at a time, and tick each as you do it. A grown-up does any cutting.



1



2



3



4



5

Where should it go?

Good spots

somewhere sheltered from rain · out of strong wind · near plants or flowers · sunny in the morning

Bad spots

right in the open · where it gets soaked · somewhere it will get knocked over · a busy path

I put mine because

What went wrong?

Something nearly always does. Did anything not fit, fall out, or break? What did you change?

Changing your plan when it doesn't work is not failing. It's what engineers do all day.



4

STEP FOUR OF FOUR · TAKES A WHOLE WEEK

Who moved in?

Check your hotel once a day for a week. Put a tally mark for each visitor you see.

go and look

tally

colour the graph

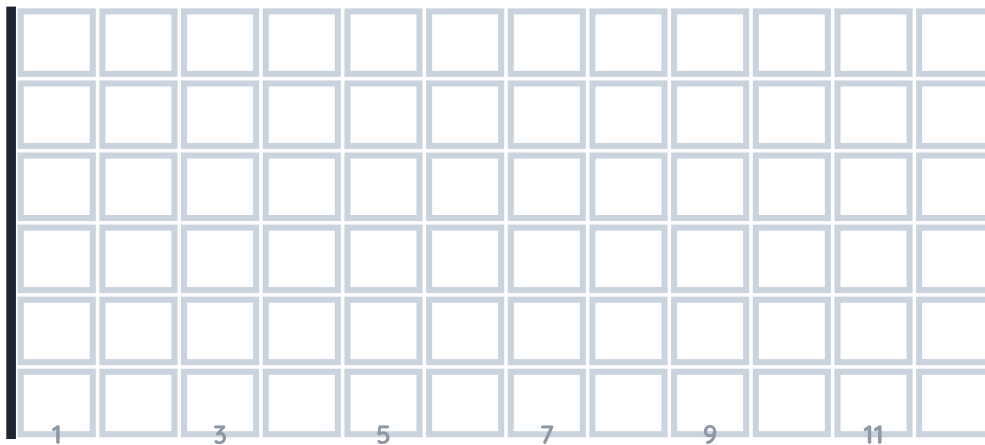
This step is slow on purpose. Thirty seconds a day is enough. If you miss a day, just leave that column empty — scientists do that too, and they write down that they missed it.

Visitor	Tally marks (one per visit)	Total
Bee		
Ladybird		
Woodlouse		
Spider		
Beetle		
Something else:		

Remember: tally marks go in bundles of five, with the fifth struck across the other four. That is the whole reason tallies exist — you can count them in fives.

Now make it a bar graph

One square = one visit. Give your graph a title.

Bee**Ladybird****Woodlouse****Spider****Beetle****Other**

a Most common visitor (the mode):

b How many visits altogether?

c Any visitor you saw none of?

d How many more bees than beetles?

What does your data actually tell you?

Which material seemed most popular?

One thing I would change about my hotel:

And one thing your graph does not tell you: whether a bug visited when you weren't looking. Most of them did! Real scientists have exactly this problem, and they say so when they report their results.

Mission complete. Go and colour in your Bug Hotel badge on the cover.

For the grown-up An empty row is a real result, not a failure — “we saw no bees” is data. The final point about unobserved visits is genuine scientific reasoning at seven: Maths D1.2, D1.3, D1.4, D1.5 · Science A1 knowing the limits of your evidence. If the hotel gets no visitors at all, that is still worth discussing: wrong spot, wrong season, or too new?



MISSION TWO

The Shop

Find out what people want, set your prices, make a poster, and open up.

Read the four steps. Then decide what kind of shop you want to run.

Step 1 Ask people what they want, and turn the answers into a graph

Step 2 Set your prices and work out the change

Step 3 Design a poster that makes people want to come

Step 4 Open the shop and count what you took

One step a day is plenty. Step 1 needs other people, so do it when someone is around. Steps 2 and 3 you can do on your own.

you choose What kind of shop?

a pretend snack shop

a drawing and card shop

a bookmark shop

a lemonade stand

a toy hire shop

a jobs-around-the-house shop

My shop will be It will be called

What you will need

For the survey

at least 8 people to ask — family, neighbours, people on a video call all count

For the poster

a big sheet of paper and colours

For the money

real coins if you have them, or paper ones you draw yourself

For the shop

a table, and whatever you decided to sell



Real shops do exactly these four things, in exactly this order. They find out what people want, they work out prices, they advertise, and then they count the money. Getting the order right is most of the job.

For the grown-up

A pretend shop works fine — no real money needs to change hands for any of the maths to be real. If you would rather it be genuine, the “jobs around the house” version has the nice property that the payment is honest and the child has to price their own labour. The mission covers surveys and bar graphs, money to \$200, persuasive writing, and design.

Maths D1, F1 · Language D1 · Arts D2



1

STEP ONE OF FOUR

Ask people what they want

Write your question and four choices. Then ask at least eight people.

 ask people tally colour the graph

☒ What makes a good survey question

Good: "Which of these four would you buy?" and then you list four things.

Not good: "What do you want?" — you get twenty different answers and cannot graph any of them.

Give people a small number of choices. That is what makes the answers countable.

My survey

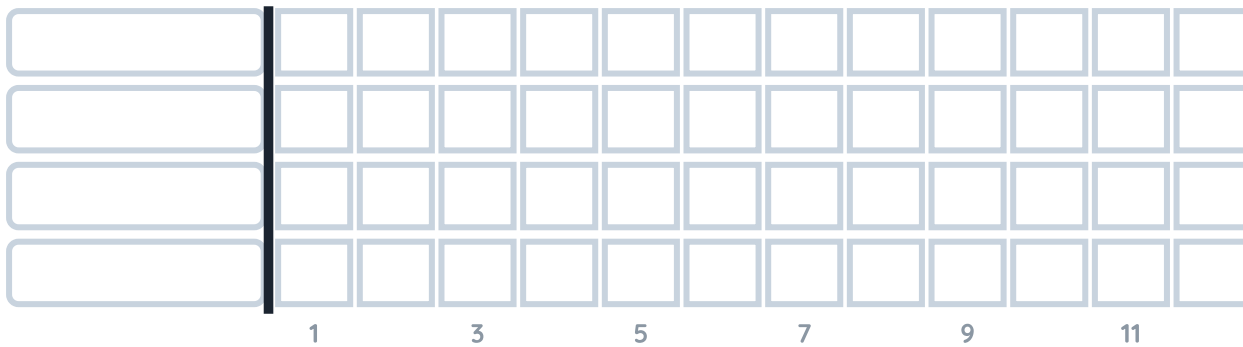
My question: _____

Choice	Tally	Total

Bundles of five, fifth struck across. How many people did you ask altogether?

Turn it into a bar graph

One square = one person. Write your title on the line and label the bars.



What the data tells me

The most popular choice (the mode) was

The least popular was

How many more chose the winner than the loser?

Was there a tie anywhere?

So my shop will definitely sell

And I probably should not bother selling

You just used data to make a decision. That is the entire point of collecting it.

For the grown-up Eight people is enough for a mode to be meaningful. The distinction between a good and a bad survey question is the real teaching here — open questions produce ungraphable answers, and discovering that first-hand is better than being told. Then insist on the decision at the bottom: data that changes nothing was pointless to collect.

Maths D1.2, D1.3, D1.4, D1.5



2

STEP TWO OF FOUR

Set your prices

Write four things you will sell and a price for each. Then work out the coins and the change.

write

work it out



dime 10¢



nickel 5¢



quarter 25¢



loonie 100¢



toonie 200¢

My price list

Thing I am selling	Price	Coins that make exactly that

Keep prices under \$2 so the coin work stays doable. Round numbers like 25¢, 50¢ and 75¢ are much easier to handle than 37¢.

☒ Working out change

Something costs 75¢ and someone pays with a loonie (\$1 = 100¢).

Count up from 75 to 100: 75 → 80 → 90 → 100. That is 5 + 10 + 10 = 25¢ change.

Counting up is much easier than subtracting, and it is exactly what shopkeepers do.

They buy	It costs	They pay with	Change
one thing at 75¢	75¢	\$1	
one thing at 50¢	50¢	\$1	
one thing at 40¢	40¢	\$1	
two things at 25¢ each		\$1	
two things at 60¢ each		\$2	
three things at 25¢ each		\$1	

The pricing problem

This is the hard bit of running a shop, and there is no right answer.

Price too high

You make a lot on each one — but hardly anybody buys anything.

Price too low

Everybody buys one — but you barely make anything at all.

Would you rather sell 2 things at 50¢ each, or 5 things at 20¢ each?

$2 \times 50¢ =$ $5 \times 20¢ =$ Which is more?

For the grown-up Counting up for change is the method actually used behind tills and is far more reliable at this age than column subtraction. The last question is a nice surprise: five at 20¢ beats two at 50¢, so cheaper can earn more. That is genuine reasoning about multiplication, not just arithmetic.

Maths F1.1 • B2.4 • B2.5



3

STEP THREE OF FOUR

Make a poster

Tick the five things every poster needs. Then plan yours in the box.

 write design

Five things every poster needs



A big title
readable from far away



What you sell
say it plainly



The prices
so nobody has to ask



When and where
day, time, place



A picture
eyes go there first

Words that make people want to come

fresh

handmade

only

new

delicious

one day only

best

don't miss it

come and see

limited

Careful – only write things that are **true**. A poster that promises something you don't have is not clever, it just makes people cross.

Design choices

Colour

Warm colours (red, orange, yellow) grab attention.
Cool colours (blue, green) feel calm. Which suits your shop?

Repetition

Repeat a shape or colour along the edge to make a border. It makes a poster look finished.

Size means importance

Whatever is biggest gets looked at first. So the title should be the biggest thing.

Plan it first



A rough sketch. Where will the title, picture and prices go?

My poster words

Title:

What I sell:

Prices:

When and where:

One persuasive word I'll use:

Now make the real poster on a big sheet of paper. This page is only the plan.

Test it

Stick your poster up and stand back five big steps. Can you still read the title? If not, what needs to change?

For the grown-up The five-steps-back test is the whole design lesson in one action — it turns "make it big" from an instruction into something she discovers. The note about only writing true things is worth a moment; persuasive writing and honest writing are not in conflict, and it is a good age to say so.

Language D1, D2 • Arts D1, D2



4

STEP FOUR OF FOUR

Open up and count the takings

Write down every sale as it happens. Then add up what you took.

write

add it up

Sales record

Sale	What they bought	Price	Running total
1			
2			
3			
4			
5			
6			
Everything I took altogether			

The running total column means you never have to add it all up at the end — you just add each new price to the last total. Shopkeepers do exactly this.

Did you actually make anything?

If your things cost something to make, you have to take that off. This is a two-step problem.

Step 1 · What I took in

Step 2 · What it cost me

What I actually made

If nothing cost you anything, then what you took in is what you made. Write the same number in both.

Looking back at your survey

The thing my survey said would be most popular:

The thing that actually sold most:

Were they the same?

If they were different, that is interesting, not a mistake. What people say they will buy and what they actually buy are often not the same, and every real shop finds this out too.

If I ran it again

One price I would change:

One thing I would stop selling:

One thing I would add:

Mission complete. Go and colour in your Shop badge on the cover.

For the grown-up

The survey-versus-reality comparison is the sharpest idea in this mission and worth lingering on — stated preference and revealed preference are genuinely different things, and noticing the gap at seven is impressive. If the shop was entirely pretend, invent a small cost for materials so the two-step subtraction still has something to bite on.

Maths F1.1, B2.4 · D1.5



MISSION THREE

Weather Watcher

Build real instruments, record the weather for a week, then explain what happened.

Read the four steps. Step 2 takes a whole week, so start on a Monday if you can.

Step 1 Build a rain gauge and a wind sock

Step 2 Record the weather every day for a week

Step 3 Turn your week of numbers into graphs

Step 4 Explain where rain comes from, and write a weather report

Step 2 is one minute a day for seven days. If you forget a day, leave it blank and write "missed" — that is what real weather scientists do. Steps 1, 3 and 4 are one sitting each.

What you will need

For the rain gauge

a clear straight-sided plastic bottle, a ruler, tape, and a grown-up to cut the top off

Useful but not needed

an outdoor thermometer. If you don't have one, use a weather app or the news instead

For the wind sock

a paper or plastic tube, string, and strips of light plastic bag or ribbon

Somewhere outside

a spot away from walls and trees where rain can fall straight in

Safety rules for this mission

- ☐ A grown-up cuts the bottle
- ☐ Don't go outside in a thunderstorm

- ☐ Never look straight at the Sun
- ☐ Ask before putting things in the garden



Weather scientists are called **meteorologists**, and the main thing they do is exactly this: measure the same things, in the same place, every single day, and look for patterns. Doing it once tells you nothing. Doing it for a week starts to tell you something.

For the grown-up This mission covers measurement in centimetres, data collection and graphing, the mode, states of water and the water cycle, and report writing. A straight-sided bottle matters for the rain gauge — a curved one gives wrong readings, which is itself worth mentioning if she asks.

Science C2, E1 · Maths D1, E2 · Language D1



1

STEP ONE OF FOUR

Build your instruments

Follow the numbered steps for each instrument. A grown-up does the cutting.

build

measure

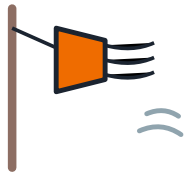
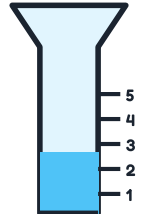
tick

A rain gauge

- ☐ 1. A grown-up cuts the top off a clear bottle.
- ☐ 2. Turn the cut-off top upside down and push it in like a funnel.
- ☐ 3. Tape a strip of paper up the side.
- ☐ 4. Use a ruler to mark every centimetre on the paper, starting at the bottom.
- ☐ 5. Put it outside, away from walls and trees, where it cannot blow over.

Why a funnel? It catches a wide circle of rain and drops it into a narrow tube, so even a small amount of rain is easy to see.

rain in



A wind sock

- ☐ 1. Make a tube from paper or use one you already have.
- ☐ 2. Tape long light strips to one end.
- ☐ 3. Tie string to the other end so it can swing freely.
- ☐ 4. Hang it somewhere open where the wind can reach it.
- ☐ 5. Work out which way is north and remember it.

A wind sock does two jobs: the direction it points tells you where the wind is going, and how far it lifts up tells you how strong the wind is.

Make your own wind scale

You need a way to write down how windy it is. Fill in what each level looks like.

0

still
sock hangs down

1

strips move a bit

2

.....

3

.....

4

sock sticks
straight out

Using the same scale every day is what makes your numbers comparable. If you change what "3" means halfway through, the data is ruined.

For the grown-up Marking the gauge in centimetres from the bottom is the measurement work, and it must start at zero at the water line. The wind scale is a real scientific idea in miniature — before you can measure something you have to agree what the numbers mean, and then never change it.

Science A2, E1 · Maths E2.2



2

STEP TWO OF FOUR · TAKES A WHOLE WEEK

Record it every day

Fill in one row each day, at about the same time. One minute is enough.



go and look



measure



write

Same time every day matters. After school is a good choice. If you measure at breakfast one day and bedtime the next, you are not really comparing the same thing. Empty your rain gauge after each reading.

Day	Sky	Rain (cm)	Wind 0–4	Temperature	How it felt
Mon					
Tue					
Wed					
Thu					
Fri					
Sat					
Sun					

Words you can use

Sky:

sunny

a few clouds

cloudy

grey all over

raining

snowing

foggy

How it felt:

freezing

cold

cool

mild

warm

hot

muggy

Predict tomorrow

Each day, before you look, write what you think tomorrow will be like. Then check whether you were right.

On this day	I predicted tomorrow would be	Was I right?

Weather forecasters get it wrong quite often too. Predicting the weather is genuinely one of the hardest things there is.

For the grown-up

Consistency is the entire lesson here — same time, same place, same scale. If the week turns out completely dry, that is still a result and the graphs in step 3 will simply show zeros, which is worth talking about rather than apologising for. A quick daily reminder at a fixed moment makes this far more likely to survive seven days.

Science A1, E1 · Maths D1.1, D1.2



3

STEP THREE OF FOUR

Turn your week into graphs

Copy the numbers from your table into the graphs below.

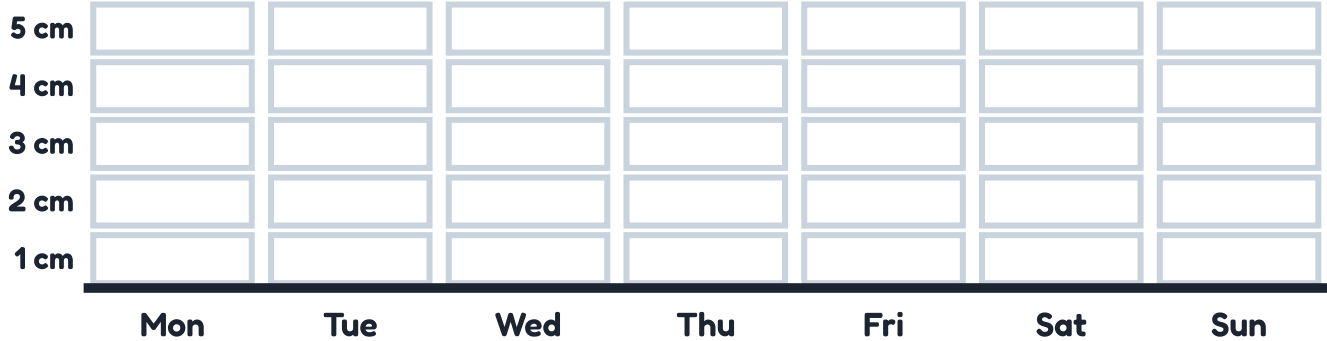
colour the graph

count

write

Rain each day

Colour up to the number of centimetres. A dry day gets no squares at all — that is fine.



Wettest day:

How many days had no rain?

Total rain for the week: cm

Were the rainy days together or spread out?

Wind, as a line plot

Put an X above the number for each day. Seven Xs altogether.



The tallest stack of Xs is the mode — the wind level you had most often. My mode was

The sky, sorted

Count how many days had each kind of sky. Then answer the questions.

Sunny	Cloudy	Raining	Something else

Most common sky (the mode):

Do the four numbers add up to 7?

Look for a pattern: on your windiest day, was there more rain or less? With only seven days you cannot be sure — but noticing a possible pattern is how every discovery starts.

For the grown-up Three different displays for three different kinds of data, which is the real lesson: a bar graph suits amounts, a line plot suits how often each value came up. The final question is deliberately unanswerable from seven days — “not enough data to tell” is the correct and most sophisticated response.

Maths D1.3, D1.4, D1.5



4

STEP FOUR OF FOUR

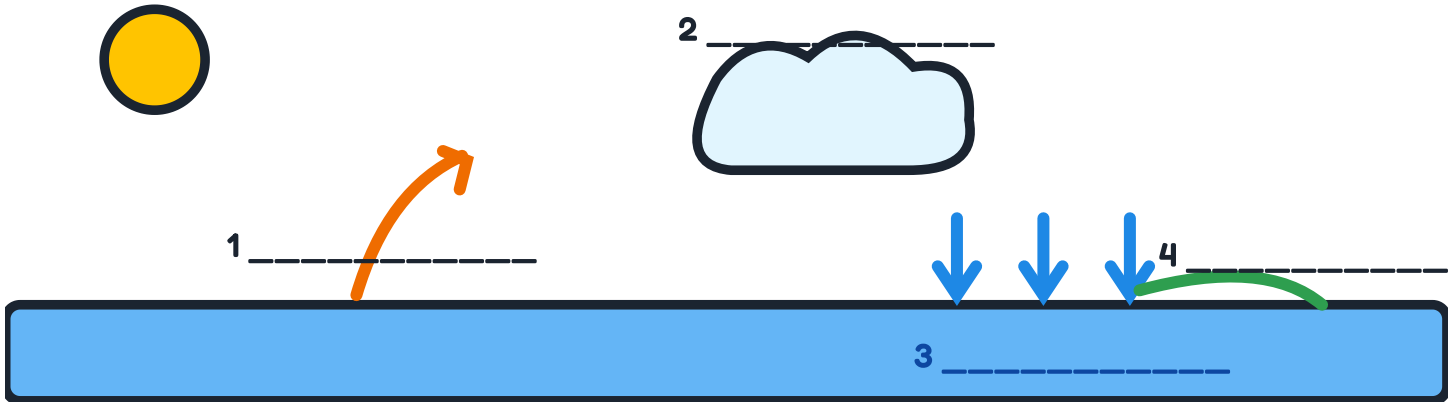
Where did the rain come from?

Label the water cycle. Then write your weather report for the week.

write

read it out

The rain in your gauge has been round this loop



Word bank: evaporation · condensation · precipitation · collection

What powers the whole thing?

Water in three costumes, in one week

Water as a liquid this week:

Water as a gas this week (you cannot see it, but it was there):

Water as a solid this week, or when you might see it:

A puddle drying up is evaporation happening right in front of you. Mist on a cold window is condensation. Both are in the loop above.

My weather report

Write it like a real forecaster: what happened, the numbers, and what stood out. Then read it out loud to someone.

Sentence starters

This week the weather was mostly...

The wettest day was...

Altogether we had...

The most surprising thing was...

Next week I think...

.....

.....

.....

.....

.....

.....

.....

.....

Looking after water

Every drop of rain you measured has been round that loop countless times before. It is the same water the dinosaurs drank. That is why not wasting it matters.

One thing I will do this week to waste less water:

Mission complete. Go and colour in your Weather Watcher badge on the cover.



MISSION FOUR

Map My World

Walk a real route, draw it from above, then write directions somebody else can follow.

Read the three steps. Step 1 needs a grown-up to come with you.

Step 1 Walk your route and write down what you pass

Step 2 Draw the map, with a grid, a legend and a north arrow

Step 3 Write directions, then test them on a real person

This mission has three steps, not four. One step a day is plenty. Step 3 is the fun one, so save it for a day when someone is around to be tested on.



you choose

What will you map?

my bedroom

my whole home

from my door to the park

my garden or yard

the walk to school

a route round the block

I am going to map

A room is easier than a street. A street is more interesting. Either is a proper map.

The three things every map must have

A title

so people know what they are looking at

A legend

a little key that explains what each symbol means

A north arrow

so people know which way round to hold it

Look at any real map — in a book, at a bus stop, in a park. Has it got all three?

Safety: a grown-up comes with you for anything outside your home. Stay on paths and pavements. Watch for driveways and roads.



The hardest part of map-making is drawing things as if you were a bird looking straight down. A table from above is just a rectangle. A tree is just a circle. Try standing on a chair and looking down at a table — that is exactly what a map shows.

For the grown-up

The bird's-eye view is the genuine conceptual hurdle; most first maps are drawn from the side. Standing on a chair and looking down at a tabletop of objects, then drawing that, is the fastest fix. The mission covers mapping, the eight compass directions, symbols and legends, and procedural writing.

Social Studies B3 · Maths E1.4, E1.5 · Language D1



1

STEP ONE OF THREE

Walk it and write it down

Walk your route slowly. Write down everything you pass, in the order you pass it.



walk it



write



count steps

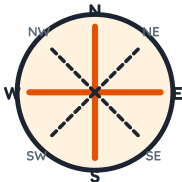
Which way is north?

Find out before you start, and it will make everything easier. Ask a grown-up, use a phone compass, or use the Sun: it comes up in the east in the morning and goes down in the west in the evening. Face the morning Sun and north is on your left.

In my home, north is towards

In order	What I passed	Which direction I turned	Steps to get there
1			
2			
3			
4			
5			
6			

The eight directions



Counting your steps

Counting steps is a real way to measure distance when you have no ruler. It only works if your steps stay the same size — so walk normally, don't stride or shuffle.

Total steps for my whole route:

The longest bit was between

The shortest bit was between

Remember the big measuring secret: a smaller unit gives a bigger number. Your steps are smaller than a grown-up's, so you will count more than they would for exactly the same route. Try it and see!

Rough sketch, right now

Before you forget, do a quick scribbly version. It does not need to be neat — the tidy one comes next.

For the grown-up

Pacing out the same stretch and comparing counts is a lovely way to revisit the inverse unit relationship from Volume 1, and it works with any two people of different heights. The rough sketch matters — drawing from memory an hour later is much harder than children expect.

Social Studies B3 · Maths E2.1



2

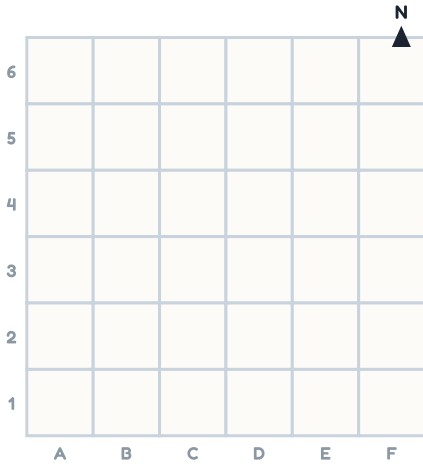
STEP TWO OF THREE

Draw the real map

Draw your route in the grid. Then fill in the legend and the title.

draw write

Title:



Legend

Draw a small symbol, then say what it means.



A good symbol is simple. A house is a square with a triangle on top — it does not need windows, a door and a chimney.

Check your map

- | | |
|--|---|
| ☐ It has a title | ☐ It has a legend |
| ☐ It has a north arrow | ☐ Everything is drawn from above |
| ☐ Things that are near each other in real life are near each other on the map | ☐ Every symbol I used is in the legend |

My start is at square and my finish is at square

For the grown-up Grid references are the Grade 2 win here — being able to say “the shed is at D2” is genuinely useful and it is the same coordinate idea that runs all the way to graphing. Don’t push for accurate scale; relative position is what matters at this age.

Social Studies B3 • Maths E1.4



3

STEP THREE OF THREE

Write directions and test them

Write directions for your route. Then give them to somebody and watch what happens.

write

test them

tick

Directions are a kind of code

A person following directions does exactly what you say, in exactly the order you say it — just like a robot running code.

Good: "Go north 6 steps. Turn east. Go 4 steps. Stop at the big tree."

Not good enough: "Go up a bit then it's over there somewhere."

Every instruction needs a direction and a how far.

My directions

1.

5.

2.

6.

3.

7.

4.

8.

You do not have to use all eight. Four clear ones beat eight muddled ones.

Now test them for real

Give your directions to somebody. Do not help them. Watch what they do and where they get confused. That is the whole point.

Who tested it	Did they get there?	Where did they get stuck?

Debug it

When code goes wrong, programmers call the problem a bug, and fixing it is debugging. Rewrite the instruction that caused trouble.

The instruction that went wrong was number, It said:

.....

Here it is again, fixed:

.....

What you learned

The hardest thing to describe clearly was

One word that turned out to be too vague:

Words like near, a bit, over there and soon feel clear when you say them but mean nothing to somebody else. Numbers and directions always beat them.

Mission complete. Go and colour in your Map My World badge on the cover.

For the grown-up Following the instructions *too literally* is the best gift you can give here — if a step says "go to the tree" and there are two trees, stop and look puzzled. Discovering that ambiguity live is far more instructive than being told to be more specific, and it is exactly how debugging feels.

Maths C3.1, C3.2 · Language D1, D2 · Social Studies B3



MISSION FIVE

The Machine

Build a machine that moves something from one place to another without you touching it.

Read the three steps. Then read the challenge in the box below.

Step 1 Hunt for simple machines and choose which one to use

Step 2 Design it, then build it

Step 3 Test it three times and make it better

The challenge

Move a small object — a toy, a marble, a ball of paper, a coin — from **one place to another**, without touching it once it has started. You can give it **one push** at the beginning, or **let go** of it. After that, your machine does the work.

There is no single right answer. A ramp counts. A pulley counts. A row of dominoes counts. A tube counts.

Three steps, one a day. Step 3 is where most of the learning happens, so don't skip it even if the machine works first time.

What you will need

Building things

cardboard, tubes, boxes, books to prop things up, tape, string, straws, paper plates

For measuring

a ruler, and something to count with

Something to move

a marble, a toy car, a ping-pong ball, a crumpled-up paper ball, a small toy

Space

a cleared floor or a big table, and permission to use it

Safety: a grown-up does the cutting. Keep marbles away from small children and pets. Nothing heavy on a slope where it could fall on a foot. Clear up at the end.



Machines do not make work disappear. A ramp does not magic a ball to the top — it just means you push less hard for longer. That trade is what a simple machine *is*.

For the grown-up The brief is deliberately wide so there is no wrong approach. This mission covers the six simple machines, forces and friction, fair testing with one variable changed at a time, and measuring in centimetres. Expect the first build to fail; that is the mission working, not going wrong.

Science D1, D2, A1, A2 · Maths E2.2



1

STEP ONE OF THREE

Go and find some machines

Find each simple machine somewhere in your home. Write where you found it.



go and hunt



write

Machine	What it does	Where I found one
Lever	a bar on a pivot	
Ramp	a slope	
Wheel and axle	a wheel on a rod	
Pulley	a wheel with a rope	
Wedge	splits or cuts	
Screw	a ramp wrapped round	

Stuck on pulley? Look at window blinds, a washing line, or a flagpole. Stuck on screw? A jar lid or a bottle cap counts.

Forces are pushes and pulls

Your machine will need a force to get things moving. Tick where each force could come from.

- ☐ gravity pulling it down a slope
- ☐ one push from me at the start
- ☐ something falling and hitting it
- ☐ a stretched elastic band
- ☐ a heavier thing pulling a lighter one
- ☐ rolling downhill and keeping going

Gravity is free and always available. Most machines built for this challenge use it — make something start high and end low, and gravity does the work for you.

Friction: your helper and your enemy

Too much friction

Your object sticks, slows down, or stops halfway. Carpet, towels and rough card all cause this.

Too little friction

Your object shoots off the end and cannot be stopped. Very smooth and very steep does this.

Which surfaces will you use, and why?

My plan for the challenge

The thing I will move is

It will start at

It will finish at

The simple machine I will use is

For the grown-up Naming gravity as a free and reliable force is the practical insight that makes this buildable — start high, end low. The friction section matters because it is the commonest reason a first attempt fails, and knowing that in advance turns a frustration into a diagnosis.

Science D2 · A1



2

STEP TWO OF THREE

Design it, then build it

Draw your design first. Label the parts. Then build it.

draw build measure

My design

Draw it from the side. Label at least four parts, and draw an arrow showing which way your object travels.

Measurements

How high does it start? cm

How high does it finish? cm

How far does the object travel? cm

How many parts does it have?

Take away the finish height from the start height. That is your drop: cm

Build order

Write what you will do, in order. Tick each as you finish it.

- ☐ 1.
- ☐ 2.
- ☐ 3.
- ☐ 4.

First try

Did the object get all the way to the finish?

If not, where did it stop?

What do you think went wrong?



If it did not work, you are exactly on schedule. Almost no machine works the first time. Engineers expect this — that is why they always build a test version first and call it a **prototype**. What you just built is a prototype. Step 3 is where it gets good.

For the grown-up The drop calculation is a genuine subtraction with a real answer she can check by looking. Resist fixing the machine for her; the diagnosis in the “first try” box is worth more than a working prototype, and step 3 depends on there being something left to improve.

Science A2, D2 · Maths E2.2, B2.4



3

STEP THREE OF THREE

Test it, then make it better

Change one thing each time, then test. Never change two things at once.



change it

measure

write

Why only one thing at a time

Suppose you make the ramp steeper and swap the marble for a heavier ball, and it suddenly works. Which change fixed it? You have no idea — it could be either one, or both together.

Change one thing, test, write it down. Then change the next thing. That is called a **fair test**, and it is how every scientist works.

Try	The one thing I changed	How far it went	Better or worse?
1	nothing yet — this is the first build		—
2			
3			
4			

Things you could change

- | | | |
|---|---|--|
| ☐ make it steeper | ☐ make it less steep | ☐ change the surface |
| ☐ use a different object | ☐ make the track wider | ☐ add a wall to stop it falling off |
| ☐ make it longer | ☐ add a curve | ☐ tape a loose join |

What your results show

Making it steeper made the object go

A rougher surface made the object go

My best try was try number, and it went cm

The change that helped most was

Show somebody

Demonstrate your machine to someone. Explain it using these three words: force, friction, and the name of your simple machine.

.....
.....

Who did you show? What did they ask you?

Mission complete. Go and colour in your Machine badge on the cover.

For the grown-up

The one-variable rule is the single most transferable idea in the whole book, and it applies to every experiment she will ever do. If she changes two things at once, don't stop her — let the ambiguous result happen and then ask which change was responsible. The answer "we can't tell" lands much harder when she reaches it herself.

Science A1, A2, D2 · Maths E2.2



MISSION SIX

Story Studio

Plan a story, write it, illustrate it, and read it out loud to somebody.

Read the three steps. You will not have to think of everything from nothing.

Step 1 Choose your character, your place, and the problem

Step 2 Write the story in four parts

Step 3 Draw a picture and read it out loud

You get to choose from lists

A blank page is the hardest thing about writing a story, so this mission does not give you one. Every part has a list to choose from. Pick from the list, or use your own idea if you have one. Both count as writing a story.

Three steps, one a day. Step 2 is the longest. If writing tires your hand, you can tell the story out loud and have a grown-up write some of it down — the story is still yours.

Every story has the same four parts

1 • Who and where

We meet somebody, somewhere.

2 • A problem

Something goes wrong.

3 • Trying

They try to fix it. Maybe twice.

4 • The end

It is sorted out, one way or another.

Think of any story you know well. Does it have all four? Try it with one:



The problem is the most important part. A story where nothing goes wrong is not really a story — it is just a list of things that happened. The problem is what makes somebody want to keep reading.

For the grown-up The four-part structure is doing the heavy lifting here, and the choice-lists are deliberate: selecting from options is a very different cognitive task from generating from nothing, and it produces just as much genuine creativity. Scribbling part of the draft is a legitimate accommodation and does not make the story less hers.

Language D1, D2, D3 · Arts B, D



1

STEP ONE OF THREE

Choose your ingredients

Circle one thing from each yellow box. Then fill in the plan at the bottom.

☐ circle ☐ write

1 · Who is it about?

a very small dragon a girl who can talk to birds a robot who is scared of rain an old woman with a strange umbrella
a cat who has lost something a boy on his first day somewhere new a lighthouse keeper my own idea

2 · Where does it happen?

a snowy forest a busy market on a boat a library at night the bottom of a garden a train that never stops an island
my own idea

3 · What goes wrong?

something important goes missing they get completely lost a promise gets broken somebody needs rescuing a door will not open
nobody believes them they are too small to reach my own idea

My story plan

My character is

Their name is They are years old

Two words that describe them: and

The story happens in

The problem is

How does it get fixed?

This is the bit worth thinking about longest. Write two different endings, then pick your favourite.

Ending A:

.....

Ending B:

.....

I am going to use ending because

For the grown-up Two endings, then a choice with a reason, is a proper authorial decision and much more interesting than "how does it end?" Don't push for the more dramatic option; if she can say why she prefers hers, that is the skill. Naming the character and giving an age makes the writing in step 2 noticeably easier. Language D1.1, D1.2



2

STEP TWO OF THREE

Write it in four parts

Write a few sentences in each box. Do not worry about spelling yet.

write

check at the end

Sentence starters, if you want them

One cold morning...

Nobody knew that...

Suddenly,

Just then,

At first...

But it did not work, so...

In the end,

And after that,

1 • Who and where

2 • The problem

3 • Trying to fix it

4 • The end

Now check it — and only now

- | | |
|---|---|
| ☐ Capital letter at the start of each sentence | ☐ Full stop, question mark or ! at the end |
| ☐ Capitals on names and places | ☐ Every sentence has both halves |
| ☐ I used at least one describing word | ☐ It makes sense when I read it aloud |

Give your story a title:

A good title makes somebody want to read it, and does not give the ending away.

For the grown-up Do not correct anything while she is drafting — the ideas are the hard part and interruption stops the flow. The checklist comes out only at the end, and reading aloud catches more than proofreading does. Box 3 gets three lines because “they try, and it does not work, so they try again” is what makes a story feel like a story. Language D2.1, D2.2, D3



3

STEP THREE OF THREE

Draw it and read it out

Draw the most exciting moment. Then read your story out loud to somebody.

draw

read it out

or act it

The picture

Use all three depth tricks: things near you are bigger and lower down, and something should overlap something else.

☐ I changed the sizes

☐ I used high and low

☐ I overlapped two things

Reading it out loud

Your voice is a tool. Try these while you read.

☐ Slow down at the exciting bit

☐ Go quiet for something secret

☐ Pause before the ending

☐ Use a different voice for the character

you choose

You can read it to a person, to a pet, to a toy, or into a recording. Any of those counts. You can also just hand it to somebody to read on their own — that counts too.

I read it to

Freeze the best moment

Make a freeze frame of the most exciting moment — a still picture with your body, like pressing pause. Nobody moves and nobody speaks. Hold it for three seconds. You can use toys or figures instead of your own body.

What is your face doing in the freeze frame?

Looking back

The bit I am most pleased with is

The hardest bit to write was

Somebody who heard it said

Mission complete. Go and colour in your Story Studio badge on the cover. That is all six badges — well done.

For the grown-up Offering a pet, a toy or a recording as valid audiences is deliberate; performing to a person is not the skill being assessed and shouldn't be the barrier. Ask what she is most pleased with before offering any opinion of your own — her judgement first, then yours.

Language D3 · Arts B1, D1 space

Three games to play

All you need is two dice, some coins, and somebody to play against.

play
 colour
 count

Game 1 • Array Attack

You need: two dice and a colour each.

How to play: Roll both dice. That is your rows and your columns. Colour in that array anywhere on your grid — it must be a solid rectangle. Write the multiplication inside it. If it will not fit anywhere, you miss a turn. The winner is whoever has coloured the most squares when neither player can fit anything.

Player 1

Squares coloured:

Player 2

Squares coloured:

Think about it: late in the game, would you rather roll a 6 and a 6, or a 2 and a 3?

Game 2 • Race to Two Dollars

You need: one die and a pile of coins — nickels, dimes and quarters.

How to play: Roll the die. 1 or 2 means take a nickel. 3 or 4 means take a dime. 5 or 6 means take a quarter. Add up your total each turn. The winner is the first to reach exactly \$2 — and you must land on it exactly, so near the end you may have to wait for the right roll.

Turn	Player 1 — coin	Total	Player 2 — coin	Total
1				
2				
3				
4				
5				
6				

Swap for a bigger coin whenever you can — five nickels for a quarter, two dimes and a nickel for a quarter. It keeps your pile small and the adding easy.

Game 3 • Fact Snap

You need: a deck of cards with the picture cards taken out. Ace counts as 1.

How to play: Split the deck between two players. Both turn over one card at the same time. The first person to say the total out loud takes both cards. If you say a wrong number, the other player gets them. Whoever has the most cards at the end wins.

Harder version: say the difference instead of the total. Hardest: say the two numbers multiplied.

Rounds won: Me Them Which version did you play?

For the grown-up Array Attack is the best of the three — it turns multiplication into a spatial strategy problem, and late in the game a small array is worth more than a big one because it still fits. Fact Snap is pure speed drill disguised as a card game, and the harder versions keep it useful all year.

B2.5 • F1.1 • B2.2



Think it through

Read all the clues before you write anything. Cross things out as you rule them out.

☒ tick and cross

write

☒ How to use the grid

When a clue tells you something is impossible, put a × in that square. When you know something is true, put a ✓ — and then you can cross out the rest of that row *and* the rest of that column, because each person has only one pet and each pet has only one owner. Crossing things out is not wasted work. It is how you find the answer.

Puzzle 1 · Who owns which pet?

1. Ana's pet does not have any legs.
2. Ben's pet is not the cat.

	cat	dog	fish
Ana			
Ben			
Cal			

Ana has the Ben has the Cal has the

A hint, if you need it

Which of the three pets has no legs? There is only one. So clue 1 tells you Ana's pet straight away.

Once you know Ana's, cross out that whole column for Ben and Cal. Then clue 2 finishes it.

Puzzle 2 · The race

Four children ran a race. Work out who came where.

1. Maya was not first.
2. Sam finished before Maya.
3. Leo finished right after Maya.
4. Priya finished last.

1st	2nd	3rd	4th
.....			

Start with clue 4 — it tells you something for certain, with no working out at all. Always start with the clue that gives you a fact for free.

Puzzle 3 · The odd one out

In each row, one thing does not belong. Circle it and say why. Some rows have more than one sensible answer — what matters is your reason.

- a 12 24 17 36 50 because
- b square triangle circle hexagon because
- c frog snake toad newt because
- d 25 50 60 75 100 because

For the grown-up Logic grids are new to most children and the technique has to be taught explicitly: cross out what is impossible, and a tick lets you clear a whole row and column. Puzzle 3 is deliberately open — in row b, the circle has no straight sides but the triangle is the only one with three, and both are good answers if the reason holds up. Maths C4 · Science B2



Word puzzles

Four different puzzles. Do them in any order you like.

circle

write

1 · Word search

Words go across and down only. Never backwards, never diagonally.

U	V	W	B	O	W	S	M	M	M
R	M	D	W	A	R	R	A	Y	P
U	V	M	E	B	G	M	C	M	G
L	O	S	A	F	D	I	K	A	U
E	B	T	T	D	A	S	T	P	E
R	S	O	H	D	L	S	B	U	A
C	G	R	E	U	M	I	A	E	V
I	L	Y	R	U	L	O	D	P	D
D	P	O	P	P	J	N	G	C	E
D	M	A	C	H	I	N	E	K	I

MISSION

BADGE

ARRAY

RULER

WEATHER

STORY

MACHINE

MAP

2 · Word ladders

Change one letter each step. Every step must be a real word.

CAT → → → DOG

BAT → → → PIG

Clue for the first: the middle letter changes, then the last, then the first.

3 · Mixed-up letters

Rearrange the letters to make a real word.

TAC →

PIT →

WON →

PAT →

MEAT →

STOP →

The last two have more than one right answer. Can you find two for each?

4 · Animals in hiding

There is an animal hiding inside each word. Circle it.

caterpillar

coward

ratio

bearded

owlet

foxglove

henna

dogwood

5 · Two words stuck together

Join one word from each side to make a new word. Use every word once.

sun rain foot butter

bow fly ball flower

snow tooth pan cup

brush cake man cake

Careful — cake appears twice, and both are correct with different partners.

For the grown-up Word ladders are excellent phonics practice in disguise, because changing one letter forces attention to individual sounds and positions. The anagram section deliberately includes two with multiple answers — finding a second one is harder and more satisfying than finding the first.

B2 phonics · B2 morphology · vocabulary



Number benders

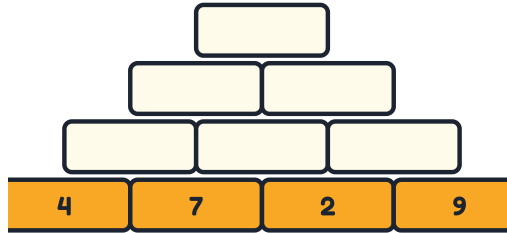
These are meant to be hard. Try things out and cross out what does not work.

7 work it out

write

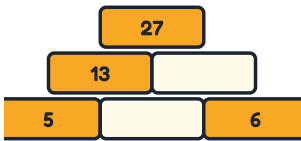
1 • Number pyramid

Add the two bricks below to get the brick above.



2 • Backwards pyramid

You know the top. Work down. There is only one answer.



3 • Magic square

Use each of 1 to 9 once. Every row, every column and both diagonals must add to 15.

4		2
	5	
8		6

Start with a row that already has two numbers in it.

4 • Missing digits

One digit is hidden in each. Work out what it must be.

$$2 \dots + 18 = 45$$

$$\dots 6 - 19 = 37$$

$$6 \dots - 24 = 41$$

$$\dots 0 + 35 = 105$$

5 • Who am I?

I am between 120 and 130. I am even. My digits add up to 7.

I am

I am between 130 and 160. You say me counting by 25s.

I am

I have 1 hundred and 0 tens. I am odd. My digits add to 8.

I am

6 • How many ways?

You have quarters, dimes and nickels. How many different ways can you make exactly 40¢? Write each way on a line. There are more than three.

.....

.....

.....

.....

.....

I found ways. How did you make sure you had not missed any?

For the grown-up Struggling productively is the point — resist rescuing too early. The backwards pyramid is the strongest task because undoing addition requires subtraction, and puzzle 6 rewards a *system*: start with the most quarters possible, then work down. "How did you know you hadn't missed any?" is the real question.

B2 · C2 · F1.1 · C4



Make puzzles for somebody else

Fill in each blank puzzle. Work out the answer first, then take the numbers away.

write test it on someone

✓ The secret of making a good puzzle

Always build it backwards. Work out the whole finished answer first, then decide which bits to hide.

Then check the most important thing: is there **only one** possible answer? If two different answers both work, your puzzle is broken and you need to give one more clue.

A pyramid

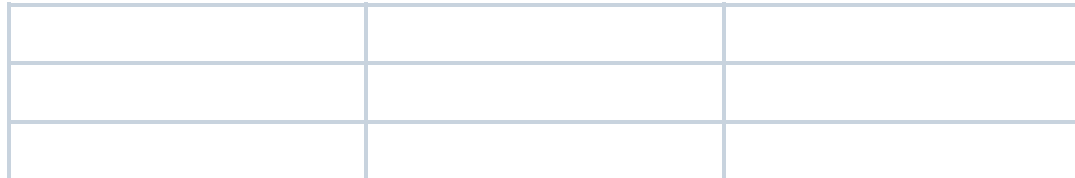
Fill in the bottom row, add your way up, then rub out some bricks.



My top number is

A magic square

Tricky to invent from nothing, so here is the trick: take the one from sheet 43 and turn it round. Rotate it a quarter turn, or flip it over. It still works, but it looks completely different.



Every line should still add to

A secret code message

Choose a short word. Write a calculation for each letter, using A=1, B=2 and so on. Then let somebody crack it.

.....				
.....				

My secret word is — fold this corner over so they cannot see it!

A "who am I?" riddle

Give three clues. Check that only one number fits all three.

1. I am between and

2. I am

3.

The answer is

Did you check that no other number fits?

A logic puzzle

Three people, three things. Write two clues that give away just enough.

The three people:

The three things:

Clue 1:

Clue 2:

Now test them

Give your puzzles to somebody. Which one was hardest for them?

Did any of them turn out to have two answers? If so, what extra clue would fix it?

For the grown-up Making a puzzle is considerably harder than solving one, and the checking step is the real learning: a puzzle with two answers is broken, and finding that out is a genuine logical insight. The rotate-the-magic-square trick is legitimate mathematics — there are eight arrangements of the same square and all of them work.

C4 · B2 · C2



You got to the end

Two last challenges, and then a certificate to fill in.

7 work it out

write

colour

The final number challenge

Every answer uses something from this book.

a $8 + 7 =$

b $4 \times 5 =$

c $18 \div 3 =$

d $63 - 28 =$

e $200 \text{ cm} =$ m

f $9 + 6 = 7 +$

The final word challenge

Every answer uses something from this book.

a Chop into parts: elephant

b The plural of leaf is

c do not squashed together is

d "It's a piece of cake" means

e Add a prefix to lock:

Looking back

My favourite mission was

The hardest sheet was

Something I can do now that I could not before:

Something I still want to get better at:

Count your coloured badges on the cover. How many did you get? out of 6



Certificate of Finishing

Grade 2 · Volume 2 · Missions

This certificate says that

.....
built a bug hotel, ran a shop, watched the weather for a week, drew a map, made a machine, wrote a story, and got all the way to sheet 45.

Date

Signed by a grown-up

.....
Colour the stars in. You earned them.



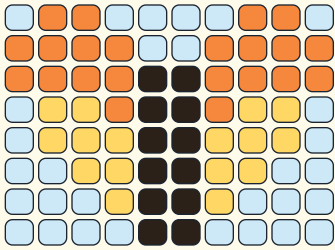
For the grown-up The looking-back questions are worth doing properly — being able to name something you couldn't do before is how a child builds a picture of themselves as someone who gets better at things. Six badges is not the goal; three missions done well beats six rushed.

All strands

Answers

Where a sheet asks for her own ideas, it says **open** — any sensible answer is right.

Sheet 1 • the hidden picture is a butterfly



Bands: 11–12 sky blue · 13–15 orange · 16–17 yellow · 18–20 dark. Any square that comes out the wrong colour points straight at the fact to practise.

2 • Crack the joke The answer is **SEVEN ATE NINE** — which is why six was afraid of seven.
 $12+7=19$ **S** · $13-8=5$ **E** · $14+8=22$ **V** · $9-4=5$ **E** · $6+8=14$ **N** · $10-9=1$ **A** · $11+9=20$ **T** · $20-15=5$ **E** · $25-11=14$ **N** · $17-8=9$ **I** · $7+7=14$ **N** · $2+3=5$ **E**. Her own code is open.

3 • Arrays are everywhere Egg box **2 rows of 6**, $2 \times 6=12$ · muffin tray **2 rows of 4**, $2 \times 4=8$ · vegetable patch **3 rows of 5**, $3 \times 5=15$ · window **2 rows of 3**, $2 \times 3=6$.
 Arrays making 12: **1x12**, **2x6**, **3x4**, **4x3**, **6x2**, **12x1**. Any three are fine.
 Seven counters make **no** proper rectangle — only 1×7 in a single line. Seven is a prime number, though she does not need that word yet.

4 • Sharing it out $12 \div 4=3$ · $15 \div 5=3$ · $18 \div 3=6$ · $20 \div 2=10$ · $16 \div 4=4$ · $10 \div 2=5$.
 Twins: $15 \div 5=3$ so $5 \times 3=15$ · $18 \div 3=6$ so $3 \times 6=18$ · $16 \div 4=4$ so $4 \times 4=16$ · $20 \div 2=10$ so $2 \times 10=20$.
 Leftovers: 13 in 4 bags = **3 each, 1 left** · 17 between 5 = **3 each, 2 left** · 11 in 2 pots = **5 each, 1 left**.
 The one you could share fairly by cutting is the **11 pencils** — five and a half each.

5 • Try it, then flex it
 gown → "gone" is wrong → flex **ow** to /ow/ · gentle → flex **g** to /j/ · circle → flex **c** to /s/ ·
 chemist → flex **ch** to /k/ · sweater → "sweetter" is wrong → flex **ea** to /e/ · money → flex **o** to /u/ · jolly → the **y** says /ē/
 Two flexes: **cycle** — c says /s/, y says /ī/. **gigantic** — first g says /j/, second says /g/. **December** — the c says /s/.
 The pattern worth naming: **c** and **g** go soft before **e**, **i** and **y**.

6 • Really long words cal-en-dar · ad-ven-ture · veg-e-table · in-vis-ible · to-ma-to · e-lec-tric ·
 in-ter-est-ing · imag-i-na-tion.
 Counts: calendar **3** · adventure **3** · tomato **3** · invisible **4** · electric **3** · interesting **4** · imagination **5** · hippopotamus **5**.

7 • Balance it again $6+9$ · $9+7$ · $10+5$ · $9+9$ · $50+20$ · $50+25$.
 True or false: $8+7=15$ **T** · $9+6=14$ **F** (it is 15) · $20-5=10+5$ **T** · $6+6=12+0$ **T** · $4+8=3+8$ **F** · $15=7+8$ **T**.
 The last one is true and often surprises people — the answer is allowed to be on the left.

8 • Big numbers in pieces $146 = 1\text{H } 4\text{T } 6\text{O} = 100+40+6$ · $109 = 1\text{H } 0\text{T } 9\text{O} = 100+9$ · $170 = 1\text{H } 7\text{T } 0\text{O} = 100+70$ · $1/9/5 = 195$ · $100+20+7 = 127$ · $2/0/0 = 200$.

Jumping from 146: **156, 136, 246, 46**. From 105: **115, 95, 205, 5**.

From 92: 102, 82, 192 — and **100 less is impossible** with the numbers she knows. That is the tricky one, and saying so is the correct answer.

Biggest-value digit: in all four numbers it is the **1** in the hundreds place, worth 100.

Mystery: **155 · 184 · 195 · 100**.

9 • The trading maze The ten correct sums, which form the path from top-left to bottom-right:
 $27+15=42$ · $38+24=62$ · $45+27=72$ · $56+18=74$ · $63-27=36$ · $82-45=37$ · $71-34=37$ · $90-26=64$ ·
 $100-45=55$ · $47+46=93$.

Everything else on the grid is wrong, and most are out by exactly 10 — the signature of a forgotten carry or a ten that never got broken open.

10 • The ruler again ribbon 0 to 12 = **12 cm** · straw 2 to 9 = **7 cm** · twig 4 to 13 = **9 cm** · eraser 6 to 10 = **4 cm**.

$100\text{ cm} = 1\text{ m}$ · $4\text{ m} = 400\text{ cm}$ · $250\text{ cm} = 2\text{ m } 50\text{ cm}$ · $175\text{ cm} = 1\text{ m } 75\text{ cm}$.

11 • Counting backwards

10s: 130, 110, 90, 80 · 5s: 90, 80, 70, 65 · 2s: 116, 112, 108, 106 · 25s: 175, 125, 75, 50, 25

even – even = **even** · odd – odd = **even** · even – odd = **odd**. Yes — exactly the same three rules as adding.

Two equal teams work for **24** and **30**, not for 19 or 27. With 27 children you could make three teams of nine, or have one child be the referee or scorer.

12 • More phrases "give me a hand" = **help me** · "over the moon" = **very happy** · "keep an eye on it" = **watch it carefully** · "let the cat out of the bag" = **accidentally told a secret** · "on the same page" = **we understand it the same way**.

Time phrases: none of them mean an exact time. "In a second" usually means a few minutes.

"In a minute" often means five or ten. "Soon" could be anything. The script "**How many minutes, about?**" is the useful part, and it deserves an honest answer.

Similes: mules are famous for **refusing to move** · eels for **being impossible to hold on to** · "fresh as a daisy" means **wide awake and full of energy**.

Marking tip On the warm-ups, speed matters as much as accuracy. A fact recalled after a three-second pause is not yet fluent, even though the answer is right.

Answers, continued

Missions are mostly her own work, so most of this is notes for you rather than answers.

Mission 1 • Bug Hotel

14 • What bugs need Every habitat must give **food, water, air and shelter**. A bug hotel provides only **shelter** — the rest comes from the garden around it, and that distinction is the point. Different bugs need **different sized spaces**, which is why a good hotel has variety rather than one material.

Insects have **six legs**. Spiders have eight and woodlice have fourteen, so neither is an insect.

15 • Design and measure The tube calculation: space width ÷ tube width = tubes per row, then rows × tubes per row = total needed. A rough estimate of tube width is fine and realistic.

16 • Write and build A good instruction starts with a doing word and says how many or how big. If a step turns out to be unfollowable while she is building, that is useful feedback about the *writing*.

17 • Who moved in Tallies in bundles of five, fifth struck across. An empty row is a real result. The closing idea matters: the graph cannot show visits that happened when nobody was watching — and most of them did. Knowing the limits of your evidence is genuine scientific reasoning.

Mission 2 • The Shop

19 • The survey A good survey question offers a small number of **choices**. An open question produces answers you cannot graph, and discovering that first-hand is better than being told. Then insist on the decision at the bottom — data that changes nothing was pointless to collect.

20 • Prices and change Counting **up** is the method: 75 → 80 → 90 → 100 is 25¢ change. The last question has a real answer: 2 × 50¢ = **100¢** and 5 × 20¢ = **100¢** — they are **the same**. That is a good surprise, and worth extending: what about 6 at 20¢?

21 • The poster The five-steps-back test is the whole design lesson in one action. Only writing things that are true is worth a moment of conversation.

22 • The takings The sharpest idea here is comparing the survey prediction with what actually sold. What people say they will buy and what they actually buy are often different, and every real shop discovers this.

Mission 3 • Weather Watcher

24 • The instruments The rain gauge must be marked in centimetres **from the water line up**, and the bottle needs straight sides or the readings are wrong. The wind scale is a real scientific idea in miniature: agree what the numbers mean, then never change it mid-week.

25 • Recording Same time, same place, same scale. A missed day should be written as “missed” rather than guessed.

26 • The graphs Three kinds of data, three kinds of display — a bar graph for amounts, a line plot for how often each value came up. The final question about wind and rain is deliberately unanswerable from seven days: “**not enough data to tell**” is the correct and most sophisticated answer.

27 • Where rain comes from 1 = **evaporation** · 2 = **condensation** · 3 = **precipitation** · 4 = **collection** — reading round the loop from the sea, up, across and down. Accept either order for 3 and 4 as long as she can explain the loop. The whole thing is powered by **the Sun**. Liquid water: rain, puddles, the sea. Gas: invisible water vapour in the air, and puddles drying up. Solid: ice, snow, frost.

Mission 4 • Map My World

29 • Walk it Pacing out the same stretch as an adult and comparing counts revisits the inverse unit relationship: her smaller steps give a **bigger** number for the same distance.

30 • Draw the map Title, legend and north arrow are the three requirements. Grid references are the win — “the shed is at D2” is the same coordinate idea that runs all the way to graphing. Don’t push for accurate scale; relative position is what Grade 2 needs.

31 • Directions Follow her instructions **too literally** and let the ambiguity show up. Words like *near*, *a bit* and *over there* feel clear to the writer and mean nothing to the reader. Numbers and compass directions always beat them. Fixing a broken instruction is **debugging**.

Mission 5 • The Machine

33 • The hunt Pulleys: window blinds, a washing line, a flagpole. Screws: a jar lid or bottle cap.

Gravity is free — start high, end low, and it does the work. That is the practical insight that makes the challenge buildable.

34 • Build it The drop is start height minus finish height. Expect the first build to fail; a prototype that fails is the mission working, not going wrong.

35 • Test and improve Steeper usually makes it go **further**; rougher makes it go **less far**. The one-variable rule is the most transferable idea in the whole book. If she changes two things at once, let the ambiguous result happen and then ask which change was responsible — “we can’t tell” lands much harder when she reaches it herself.

Mission 6 • Story Studio

37 • Ingredients Two endings then a choice with a reason is a proper authorial decision. Don’t push for the more dramatic option; being able to say *why* is the skill.

38 • Writing it Do not correct anything during drafting. The checklist comes out only at the end, and reading aloud catches more than proofreading. Box 3 has three lines because “they try, it doesn’t work, so they try again” is what makes a story feel like a story.

39 • Draw and perform The three depth tricks: near things are **bigger**, sit **lower** on the page, and **overlap** what is behind them. A pet, a toy or a recording are all valid audiences — performing to a person is not the skill being assessed.

Marking tip Missions are not marked. If a mission gets abandoned halfway, the steps that were done still count for everything they covered — three missions done properly beats six rushed.

Answers, continued

40 • Three games No fixed answers, but two things worth drawing out.
Array Attack: late in the game a **small** array is worth more than a big one, because it still fits in the gaps. So 2 and 3 beats 6 and 6 near the end — which is a genuinely surprising strategic insight.
Race to Two Dollars: encourage swapping five nickels for a quarter as she goes. It keeps the pile small and the adding easy, and it is the same “make it with fewer coins” idea from Volume 1.

41 • Logic puzzles
Puzzle 1: Ana has the **fish** (the only pet with no legs). That rules the fish out for the others, so Ben — who cannot have the cat — has the **dog**, and Cal has the **cat**.
Puzzle 2: Sam 1st, Maya 2nd, Leo 3rd, Priya 4th. Start with clue 4, which gives a fact for free. Then Maya cannot be 3rd, because Leo would have to be 4th and Priya is already there. So Maya is 2nd, Leo is 3rd, and Sam is 1st.
Puzzle 3: a **17**, the only odd one • b **circle**, the only one with no straight sides and no corners (accept *triangle* — the only one with three sides — if the reason is given) • c **snake**, a reptile among three amphibians • d **60**, the only one you don’t say counting by 25s.

42 • Word puzzles
Word search: RULER and WEATHER go down from the top row; ARRAY goes across row 2; MISSION and MAP go down from row 3; STORY goes down from row 4; BADGE goes down from row 6; MACHINE goes across the bottom row.
Ladders: CAT → COT → COG → DOG and BAT → BAG → BIG → PIG.
Anagrams: TAC = **CAT** • PIT = **TIP** • WON = **NOW** (or OWN) • PAT = **TAP** (or APT) • MEAT = **TEAM**, TAME or MATE • STOP = **POTS**, SPOT, TOPS or OPTS.
Animals hiding: caterpillar **CAT** • coward **COW** • ratio **RAT** • bearded **BEAR** • owl **OWL** • foxglove **FOX** • henna **HEN** • dogwood **DOG**.
Compounds: sunflower • rainbow • football • butterfly • snowman • toothbrush • pancake • cupcake.

43 • Number benders
1 • Pyramid: bottom 4, 7, 2, 9 → **11, 9, 11** → **20, 20** → top **40**.
2 • Backwards pyramid: the missing middle brick is $27 - 13 = 14$. The missing bottom brick is $13 - 5 = 8$. Check: $8 + 6 = 14$ ✓
3 • Magic square — every row, column and diagonal makes 15:
4 9 2
3 5 7
8 1 6
4 • Missing digits: $27+18=45$ • $56-19=37$ • $65-24=41$ • $70+35=105$.
5 • Who am I? **124** • **150** • **107**.
6 • How many ways to make 40¢? There are **seven**: 4 dimes • 3 dimes + 2 nickels • 2 dimes + 4 nickels • 1 dime + 6 nickels • 8 nickels • 1 quarter + 1 dime + 1 nickel • 1 quarter + 3 nickels. The way to be sure you have them all is to work **systematically** — start with as many quarters as possible, then as many dimes as possible, and step down one at a time. “I just kept trying” will always miss some.
44 • Make your own puzzles Open. The checking step is the real learning: a puzzle with two possible answers is broken and needs one more clue. The rotate-the-magic-square trick is legitimate mathematics — there are eight arrangements of the same square and every one of them works.
45 • The last page Numbers: a **15** • b **20** • c **6** • d **35** • e **2** m • f **8** (both sides make 15). Words: a **elephant** • b **leaves** • c **don’t** • d **very easy** • e **unlock**.

What to come back to
Sheets 1 and 2 are worth repeating every few weeks all year — instant recall of addition facts to 20 is still the single highest-value thing at this age, and it is what makes Grade 3 multiplication feel easy instead of exhausting. **Sheet 5** keeps the flexing habit alive; ask “is that a real word?” until she asks it herself. **Sheet 12’s running list** should keep growing all year — add every phrase she meets that does not mean what it says. And the **one-variable rule** from Mission 5 applies to every experiment she will ever do, so it is worth naming out loud whenever it comes up.

Curriculum reference Codes on each sheet match the Ontario curriculum documents: *Mathematics, 2020* • *Language, 2023* • *Science and Technology, 2022* • *Social Studies, 2023/2026* • *Health and Physical Education, 2019* • *The Arts, 2009*. Full expectations at dcp.edu.gov.on.ca. Curriculum content is paraphrased in plain language throughout; the documents are Crown copyright.