

Year 6 Textbook 6 A





Year 6 Textbook 6A

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Flo

Flo is flexible.
She looks for
different ways
to solve a
problem.

brave



Astrid

curious



Ash

determined



Dexter

helpful



Sparks

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This tells you which page you need.



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I can't wait to begin!



How to use this book

These pages make sure we're ready for the unit ahead. Find out what we'll be learning and brush up on your skills!



Unit 5
Fractions 2

In this unit we will ...

- ✦ Multiply any fraction by a whole number or another fraction
- ✦ Divide a fraction by a whole number
- ✦ Solve problems involving all four operations with fractions
- ✦ Solve problems involving a fraction of an amount

You will be able to multiply a fraction by a fraction by showing each fraction on the side of a grid. What is $\frac{1}{2} \times \frac{2}{3}$?

We will need some maths words. How many of these can you remember?

numerator	denominator	whole number
mixed number	proper fraction	
improper fraction	convert	simplify

We can use a fraction strip above a number line to help us multiply a fraction by a whole number and convert between improper fractions and mixed numbers. What is $\frac{2}{3} \times 4$ as a mixed number?

Discover

Lessons start with **Discover**.
Here, we explore new maths problems.
Can you work out how to find the answer?

Don't be afraid to make mistakes.
Learn from them and try again!

Multiplying a fraction by a whole number

Discover

1 a) The boat uses $\frac{1}{4}$ of a tank of fuel for each trip.
How many tanks of fuel are used in a day?
b) What is the total duration of the boat trips in a day?



Share

Next, we share our ideas with the class.

Did we all solve the problems the same way?
What ideas can you try?

Share

a) Each trip uses $\frac{1}{3}$ of a tank of fuel.
There are 5 trips in a day.
 $\frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} = 1\frac{2}{3}$
or
 $\frac{1}{3} \times 5 = 1\frac{2}{3}$
 $1\frac{2}{3}$ tanks of fuel are used in a day.

b) Each boat trip takes $1\frac{1}{2}$ hours and there are 5 trips a day.

I can multiply the whole and the fraction separately and then add them.

Method 1

$$1 \times 5 = 5$$

$$\frac{1}{2} \times 5 = 2\frac{1}{2}$$

$$5 + 2\frac{1}{2} = 7\frac{1}{2}$$

I will convert the mixed number to an improper fraction first.

Method 2

$$1\frac{1}{2} = \frac{3}{2}$$

$$\frac{3}{2} \times 5 = \frac{15}{2}$$

$$\frac{15}{2} = 7\frac{1}{2}$$

The total duration of the boat trips in a day is $7\frac{1}{2}$ hours.

Think together

Then we have a go at some more problems together.
Use what you have just learnt to help you.

We'll try a challenge too!

Think together

1 On Saturday the boat makes 7 trips. It uses $\frac{1}{3}$ of a tank of fuel for each trip.
How many tanks of fuel are used on Saturday?

$\frac{1}{3} \times 7 =$

tanks of fuel are used.

2 A fishing boat offers fishing trips. During each trip the boat travels $1\frac{1}{2}$ km.
How far does the boat travel in 4 trips? Work out the answer using both methods.

Method 1

$$\square \times 4 = \square$$

$$\square \times 4 = \square + \square$$

$$\square + \square = \square$$

The boat travels km.

Method 2

$$\square = \square$$

$$\square \times 4 = \square$$

$$\square = \square$$

3 a) Complete the multiplications.

$$\frac{1}{2} \times 2 = \square$$

$$\frac{1}{5} \times 5 = \square$$

$$\frac{1}{3} \times 3 = \square$$

$$\frac{2}{5} \times 5 = \square$$

$$\frac{1}{4} \times 5 = \square$$

$$\frac{3}{5} \times 5 = \square$$

$$\frac{1}{2} \times 4 = \square$$

$$1\frac{1}{2} \times 5 = \square$$

What patterns do you notice?
Can you find a quick way to get the answers?

I notice something between the numerator of the fraction, the whole number and the numerator of the final answer.

b) Find three fractions that multiply by a whole number to make these numbers.

 $\frac{1}{2}$ $\frac{1}{3}$ $1\frac{1}{2}$


This tells you which page to go to in your Practice Book.

At the end of each unit there's an **End of unit check**. This is our chance to show how much we have learnt.

End of unit check

1 Work out $\frac{1}{2} + \frac{1}{3}$.

2 What is $\frac{1}{2} \times 27$?

3 Lee uses $\frac{1}{4}$ of a tin of sauce each day to make a sandwich.
How many tins of sauce will he need to make a sandwich every day for 4 days?
Give your answer in its simplest form.

4 There are 30 children in a class. $\frac{2}{3}$ of the children are girls.
How many boys are in the class?

5 $\frac{1}{3}$ of a number is 24. What is the number?

6 What is the missing fraction?

7 How many hours are there in $\frac{3}{4}$ of a day?

8 Find the area of the rectangle.
 m
 m
 Give your answer in its simplest form.

9 $\frac{1}{4}$ of the pencils in a box are red.
There are 40 red pencils in the box.
How many pencils are in the box?

Unit 1

Place value within 10,000,000



In this unit we will ...

- ⚡ Learn to read and write numbers to 10,000,000
- ⚡ Partition, compare and order numbers up to 10,000,000
- ⚡ Round numbers
- ⚡ Work with negative numbers

Do you remember what this is called? We will use it to help identify the place value of digits in a number.

M	HTh	TTh	Th	H	T	O
1	0	0	0	0	0	0





We will need some maths words. Can you explain the words you have met before?

ten thousands (10,000s)

hundred thousands (100,000s)

millions (1,000,000s)

ten million (10,000,000)

place value

partition

interval

estimate

compare

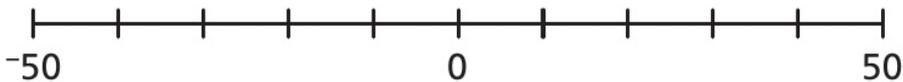
order

rounding

negative

positive

We will use this too! Can you find what the unlabelled values are?



Numbers to 1,000,000

Discover

I have made a 6-digit number using the cards. It has 4 hundreds. My number has 2 ten thousands. It is less than 800,000 and odd.



Richard

Lexi

- 1 a) What numbers could Richard have made using the digit cards shown?
- b) How many different answers can you find?

Share

a) and b) Richard's number has 4 hundreds.

Put the 4 in the hundreds column.

HTh	TTh	Th	H	T	O
			4		

Put the 2 in the ten thousands column.

HTh	TTh	Th	H	T	O
	2		4		

The digit in the hundred thousands column must be less than 8.

The 7 or the 9 must go in the ones column to make the number odd.

HTh	TTh	Th	H	T	O
6	2		4		9

The digits that are left can be placed in either the thousands or the tens column. So Richard could have made:

627,489	726,489	629,487
628,479	728,469	628,497

I made 726,489 and 728,469 when I used 7 instead of 6 as the first digit.

I made 629,487 and 628,497 when I used 7 instead of 9 in the ones column.



Think together

1 Richard has made a number using counters on a place value grid.

HTh	TTh	Th	H	T	O
● ●		● ● ●	● ● ● ●	●	● ● ● ● ● ● ● ●

- What number has Richard made?
- What is 1,000 more than Richard's number?
- What is 10 less than Richard's number?

2 What is the value of the digit 5 in each of these numbers?

a)

HTh	TTh	Th	H	T	O
1	5	2	1	8	0

b)

HTh	TTh	Th	H	T	O
4	1	2	1	0	5

- 26,514
- 519,822

Saying the numbers out loud helps me to understand the place value of each number.

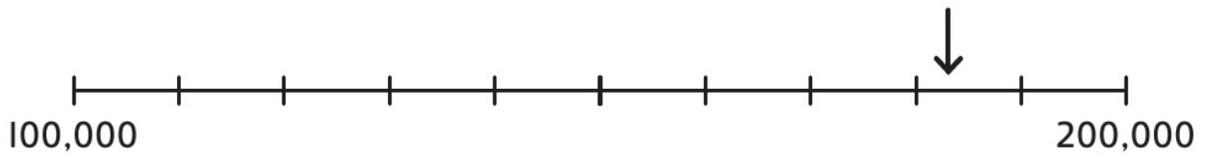



 CHALLENGE

3 Lexi makes a number using these digit cards.



She draws an arrow where her number is on a number line.



What number do you think Lexi has made?



I can see the number line is split into 10 equal parts. This will help me to work out what the missing values are.



I can see what Lexi's number has to start with by looking at where the number line starts and ends.

Numbers to 10,000,000

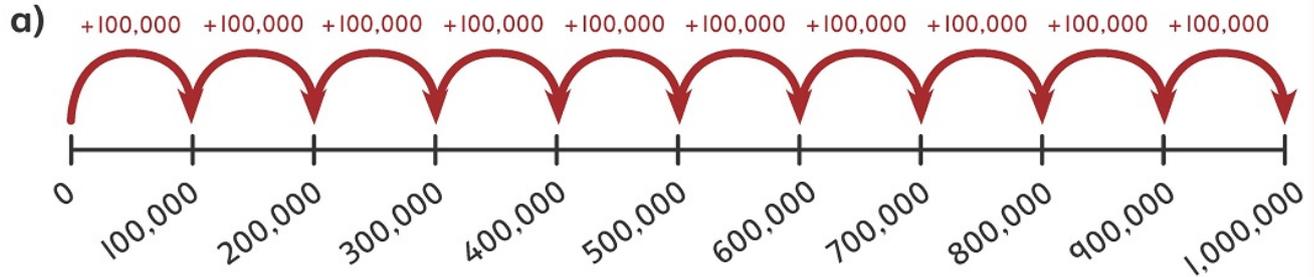
Discover



- I** a) The comic books sold for one million pounds.
How many 100,000s are in one million?
- b) Write the sale prices of the painting and the clock on place value grids.
Use the grids to help you to say the numbers out loud.

Share

I used a number line to help me count up in 100,000s until I got to one million.



There are ten 100,000s in one million.

b)



£4,590,124

M	HTh	TTh	Th	H	T	O
4	5	9	0	1	2	4

The painting cost four million, five hundred and ninety thousand, one hundred and twenty-four pounds.



£234,500

M	HTh	TTh	Th	H	T	O
	2	3	4	5	0	0

The clock cost two hundred and thirty-four thousand, five hundred pounds.

Think together

1 What numbers are shown in the place value grids?

Give your answers in numerals and in words.

a)

M	HTh	TTh	Th	H	T	O
	●●●●	●●●●●● ●	●●	●●●		●●●●●

M	HTh	TTh	Th	H	T	O
●●●●●●●	●		●●●●	●●●		●●●●●● ●●●●

b) Read the number 1,402,315 out loud.

2 Reena writes down the following number.

3,405,782

- Read Reena's number out loud.
- What is the value of the number 7 in Reena's number?
- What number is in the 1,000s position?
- What is 100,000 more than Reena's number?

I'm going to write the number in a place value grid to help me.

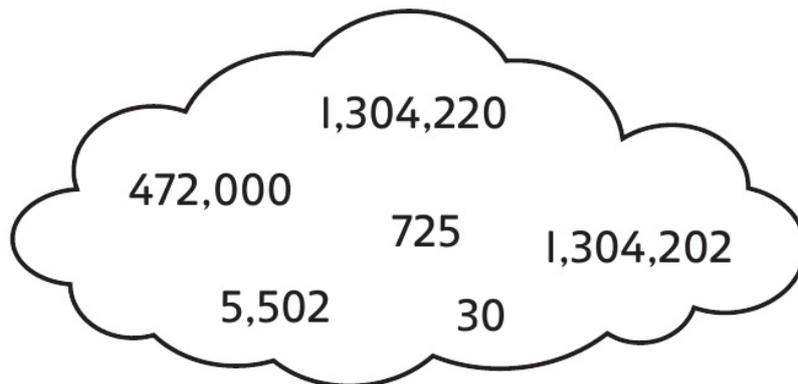


CHALLENGE

- 3 Lee is making numbers using counters on a place value grid. Lee has 12 counters.

M	HTh	TTh	Th	H	T	O
●●	●●●●	●	●	●●●		●

- a) What number has Lee made?
b) Which of the following numbers can Lee make using all 12 counters?



I wonder if there is a way of working out whether a number uses 12 counters.



I will try adding the digits together to see if that always works.



Partition numbers to 10,000,000

Discover



- I a) In the game, how much money does Jamie have?
- b) How much money does Aki have?

Share

a)



I used a place value grid to help me organise the numbers.

M	HTh	TTh	Th	H	T	O

$$4,000,000 + 500,000 + 20,000 + 100 + 20 + 3 = 4,520,123$$

Jamie has £4,520,123.

b)

I know that 10 thousands are equal to 1 ten thousand.



M	HTh	TTh	Th	H	T	O
2	0	7	1	0	0	0

Aki has £2,071,000.

Think together

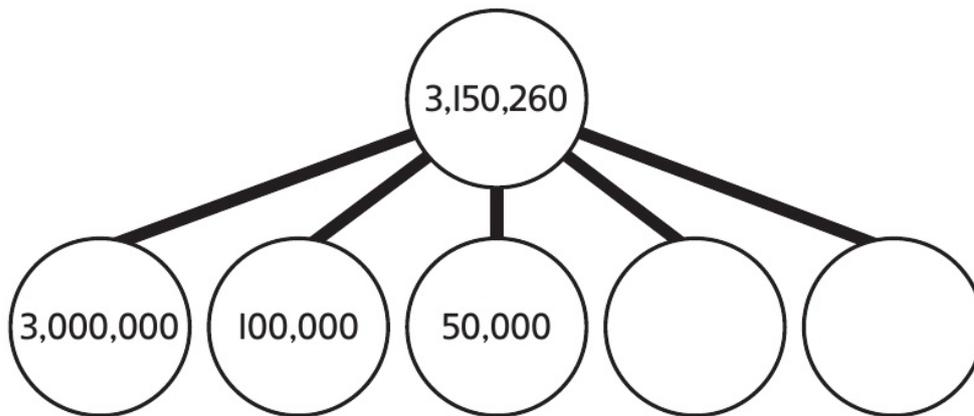
- 1 Josh writes a number in a place value grid.

HTh	TTh	Th	H	T	O
2	7	6	3	0	2

Complete the partition.

$$276,302 = 200,000 + 70,000 + \square + 300 + 2$$

- 2 a) Find the missing numbers in this part-whole model.



- b) Draw a part-whole model for three and a half million.

I will write three and a half million as a numeral first.



CHALLENGE

3 Write each of these partitioned numbers in numerals.

$$7,000,000 + 600,000 + 90,000 + 1,000 + 700 + 10 + 2$$

$$500,000 + 70,000 + 200 + 9$$

$$3 \times 100,000 + 4 \times 10,000 + 8 \times 1,000 + 5 \times 100 + 9 \times 1$$

$$4,000,000 + 38,000 + 200$$

$$9,000 + 50,000 + 700,000 + 400 + 20 + 1$$

four millions, three hundred thousands, nine hundreds,
one ten and six ones

$$300,000 + 90,000 + 9,000 + 710$$



I am going to write the numbers in a place value grid to help me organise my work.

I don't think I need to use one.

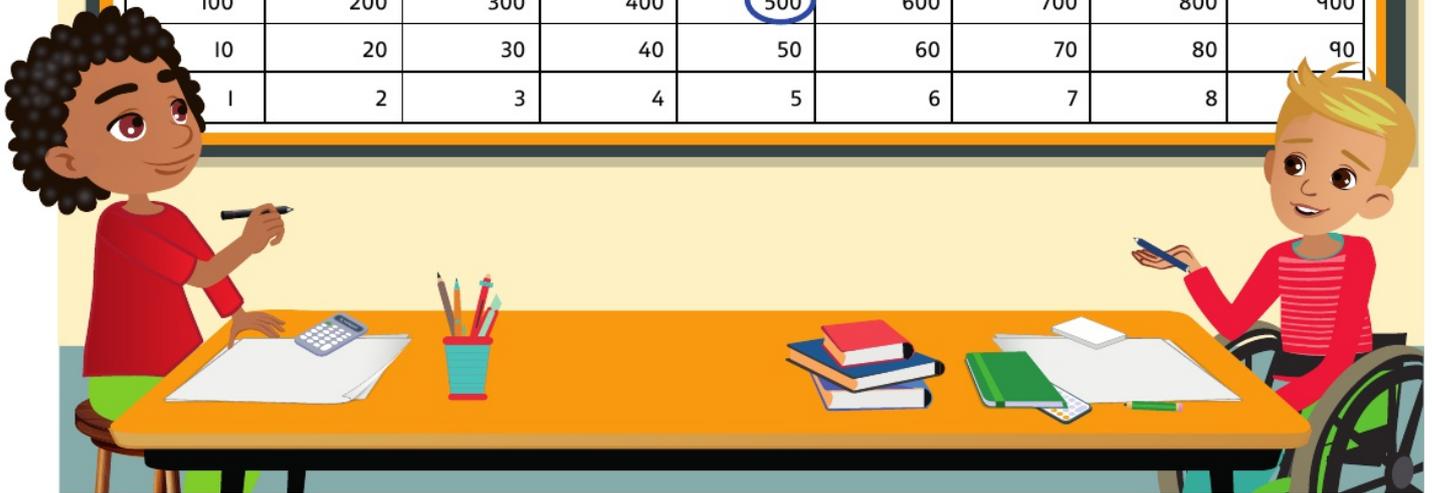


Powers of 10

Discover

Gattegno chart

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



1 a) What number is shown on the chart?

b) What is 10 times the number?

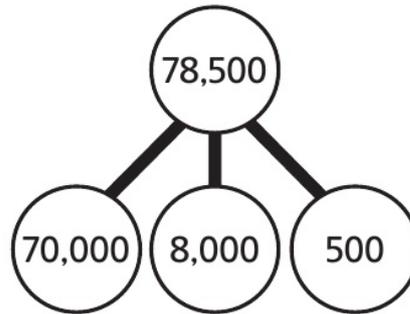
What is 100 times the number?

A Gattegno chart is made up of rows that show numbers 10, 100, 1,000 times bigger or smaller.

Share

- a) The number in the chart is made of 70,000, 8,000 and 500.

The number is 78,500.



- b) Move up one row to find 10 times bigger.

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

10 times larger ($\times 10$)

10 times smaller ($\div 10$)

10 times 78,500 is 785,000.

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

10 times larger ($\times 10$)

10 times smaller ($\div 10$)

100 times 78,500 is 7,850,000.

Think together

- 1 a) Represent 3,750 on the Gattegno chart using counters.

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

- b) Use the Gattegno chart to help you work these out.

$$3,750 \times 10$$

$$3,750 \div 10$$

$$3,750 \times 100$$

$$3,750 \times 1,000$$

I know that multiplying by 1,000 is the same as multiplying by 10 three times.

- 2 Work out

a) $230,000 \times 10$

b) $93,000 \times 100$

c) $624 \times 10,000$

d) $230,000 \div 10$

e) $93,000 \div 1,000$

