Lesson 7:

Multiply by using familiar methods.

CCSS Standard –5.OA.A.1 / 5.NBT.B.5

FLUENCY (10-min)

Whiteboard Exchange: Word Form to Standard Form

three thousand, eight hundred nineteen = _____

Word Form	Standard Form	Expanded Form
One million, two hundred twenty-three thousand, nine	1,223,009	1,000,000 + 200,000 + 20,000 + 3,000 + 9
Forty-three thousand, nine hundred seventy-one	43,971	40,000 + 3,000 + 900 + 70 + 1
Sixty-three thousand, five hundred eighty-nine	63,589	60,000 + 3,000 + 500 + 80 + 9

FLUENCY (10-min) **Whiteboard Exchange: Word Form to Standard Form**

two thousand, four hundred seventy = 2,470

four thousand, eighty-two = 4,082

seven thousand, seven = 7,007

fourteen thousand, two hundred ninety-five = 14,295

twenty-five thousand, six hundred four = 25,604

fifty thousand, one hundred three = 50,103

eighty-six thousand, twenty = 86,020

FLUENCY (10-min) **Whiteboard Exchange: Estimate Products**

$1{,}832 \times 3 \approx \square \times 3$

$1{,}832 \times 3 \approx \square$

What is 1,832 rounded to the nearest thousand?

*This statement reads "1,832 x 3 is **about** 2,000 x 3". Repeat this statement.*

Now solve for 2,000 x 3.

$8 \times 6{,}503 \approx 8 \times \square$

$8 \times 6{,}503 \approx \square$

What is 6,503 rounded to the nearest thousand?

*This statement reads "6,503 x 8 is **about** 7,000 x 8". Repeat this statement.*

Now solve for 7,000 x 8.

FLUENCY (10-min) **Whiteboard Exchange: Estimate Products**

$2{,}371 \times 4 \approx \underline{\square} \times 4$

$2{,}371 \times 4 \approx \underline{\square}$

What is 2,371 rounded to the nearest thousand?

*This statement reads "2,371 x 4 is **about** 2,000 x 4". Repeat this statement.*

Now solve for 2,000 x 4.

$5 \times 3{,}290 \approx 5 \times \underline{\square}$

$5 \times 3{,}290 \approx \underline{\square}$

What is 3,290 rounded to the nearest thousand?

*This statement reads "3,290 x 5 is **about** 3,000 x 5". Repeat this statement.*

Now solve for 3,000 x 5.

FLUENCY (10-min) **Whiteboard Exchange: Estimate Products**

$6 \times 5{,}901 \approx 6 \times \square$

$6 \times 5{,}901 \approx \square$

What is 5,901 rounded to the nearest thousand?

*This statement reads "5,901 x 6 is **about** 6,000 x 6". Repeat this statement.*

Now solve for 6,000 x 6.

$5{,}075 \times 7 \approx \square \times 7$

$5{,}075 \times 7 \approx \square$

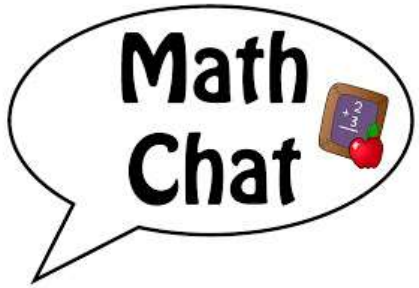
What is 5,075 rounded to the nearest thousand?

*This statement reads "5,075 x 7 is **about** 5,000 x 7". Repeat this statement.*

Now solve for 5,000 x 7.

LAUNCH (10-min)

Students represent a five-digit number using models and expressions.

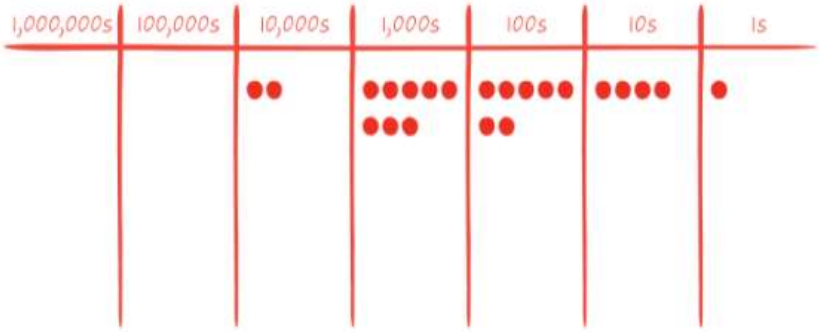


Write the following number **in as many ways as you can**!

28,741

Shhhhh!

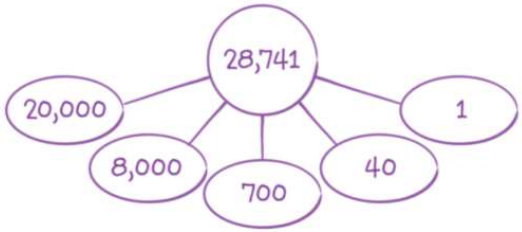
Place Value Chart



Expanded Form

20,000 + 8,000 + 700 + 40 + 1

Number Bond

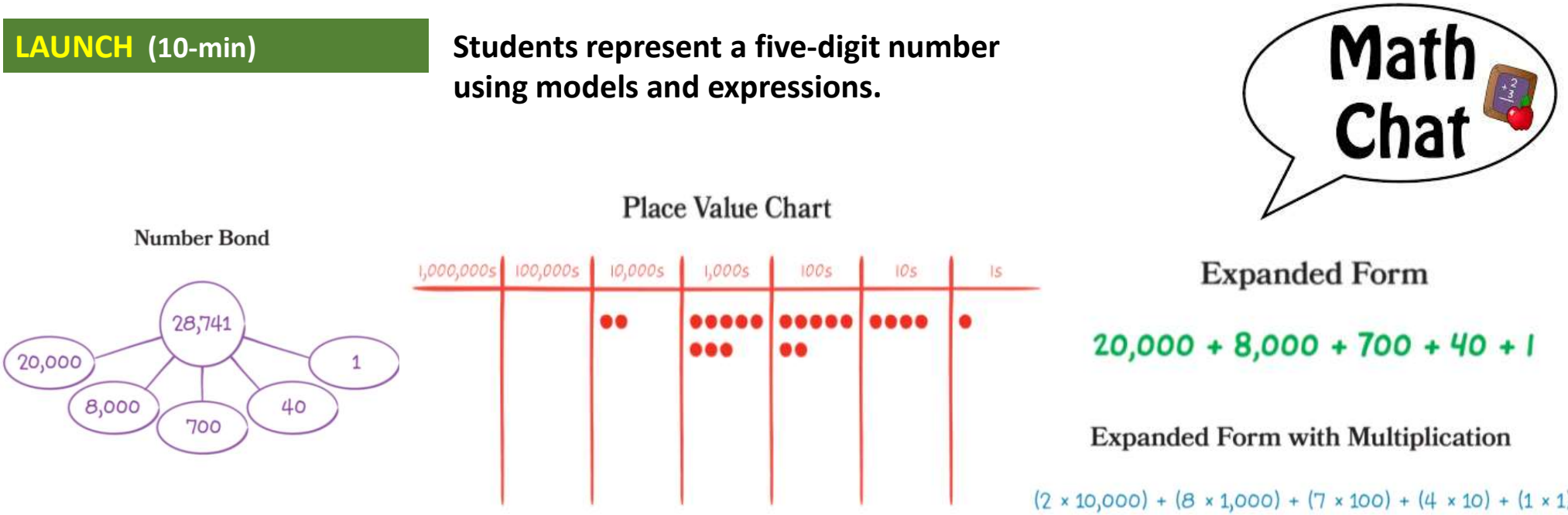


Expanded Form with Multiplication

(2 × 10,000) + (8 × 1,000) + (7 × 100) + (4 × 10) + (1 × 1)

LAUNCH (10-min)

Students represent a five-digit number using models and expressions.

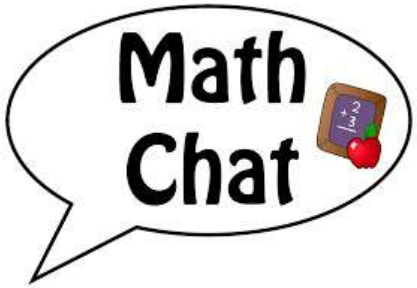


What is similar about how 28,741 is decomposed in each example? each example uses place value!

How are expanded form and expanded form with multiplication similar / different?

LAUNCH (10-min)

Students represent a five-digit number using models and expressions.



$$(4 \times 10) + (8 \times 1{,}000) + (1 \times 1) + (2 \times 10{,}000) + (7 \times 100)$$

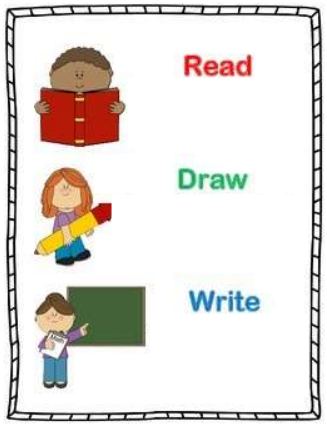
40 8,000 1 20,000 700

Does this example also represent 28,741?

Yes!!!

It has the same number of ten thousands, thousands, hundreds, tens, and ones. They are just added in a different order.

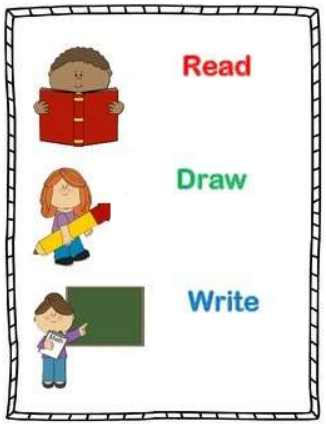
LEARN (30-min) **Select a Method to Multiply**



On a typical day, a grade 5 student takes **24,165 breaths in one day**!
How many breaths will **you and 5 friends** take in one day?

There are several different ways that you could solve this problem.
Use the Read-Write-Draw Method to connect your drawing to the story.
Be ready to explain your method!

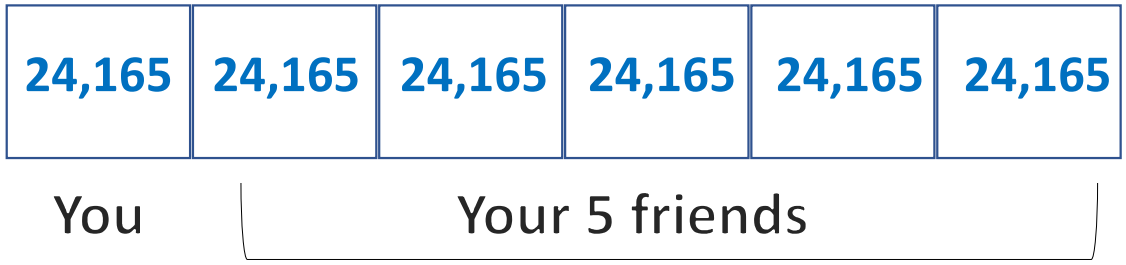
LEARN (30-min) **Select a Method to Multiply**



On a typical day, a grade 5 student takes **24,165 breaths in one day**! How many breaths will **you and 5 friends** take in one day?

Let's start be **re-reading** the problem carefully.
Next – let's draw a **tape diagram.**

Why do you think I drew 6 boxes?



What expression will solve this problem? **6 x 24,165**

Unlike prior lessons, we ACTUALLY have to solve this problem. Estimating will help us to know if our final answer is correct.

LEARN (30-min) **Select a Method to Multiply**

6 x 24,165

Estimate:
6 x 20,000 = 120,000
120,000 breaths is a good estimate.

Break Apart Method:

$$
\begin{aligned}
6 \times 24{,}165 &= 6 \times (20{,}000 + 4{,}000 + 100 + 60 + 5) \\
&= (6 \times 20{,}000) + (6 \times 4{,}000) + (6 \times 100) + (6 \times 60) + (6 \times 5) \\
&= 120{,}000 + 24{,}000 + 600 + 360 + 30 \\
&= 144{,}990
\end{aligned}
$$

*Notice in this method how the 6 is distributed to **each place value**.*

Pros – Mental Math
Cons – A lot to write; multiplication and addition are needed, neatness matters

LEARN (30-min) **Select a Method to Multiply**

6 x 24,165

Estimate:
6 x 20,000 = 120,000
120,000 breaths is a good estimate.

Area Model Method:

120,000
24,000
600
360
\+ 30
144,990

*Notice in this method how the 6 is also distributed to **each place value** but this time there is a box around each value.*

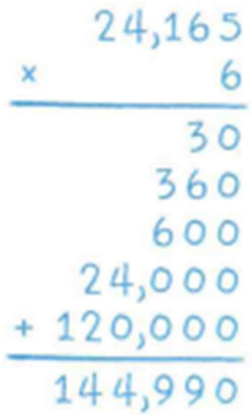
Pros – Mental Math
Cons – Have to draw boxes; multiplication and addition, takes time

LEARN (30-min) **Select a Method to Multiply**

6 x 24,165

Estimate:
6 x 20,000 = 120,000
120,000 breaths is a good estimate.

Partial Products Method:



*Notice in this method how the 6 is also distributed to **each place value** but this time each value is written underneath.*

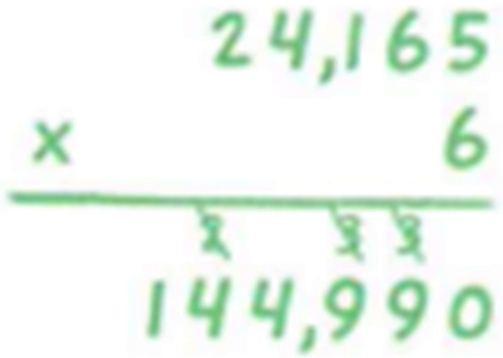
Pros – Mental Math
Cons – Line up the zero mistakes; multiplication and addition, takes time

LEARN (30-min) **Select a Method to Multiply**

6 x 24,165

Estimate:
6 x 20,000 = 120,000
120,000 breaths is a good estimate.

Standard Algorithm Method:



Notice this method is very simple looking.

Pros – Fast!!!!
Cons – You really need to have a command of your basic facts.

LEARN (30-min)

Select a Method to Multiply

Break Apart and Distribute

$6 \times 24{,}165 = 6 \times (20{,}000 + 4{,}000 + 100 + 60 + 5)$
$= (6 \times 20{,}000) + (6 \times 4{,}000) + (6 \times 100) + (6 \times 60) + (6 \times 5)$
$= 120{,}000 + 24{,}000 + 600 + 360 + 30$
$= 144{,}990$

Area Model

	20,000	4,000	100	60	5
6	120,000	24,000	600	360	30

$$\begin{array}{r} 120{,}000 \\ 24{,}000 \\ 600 \\ 360 \\ +\quad 30 \\ \hline 144{,}990 \end{array}$$

Standard Algorithm

$$\begin{array}{r} 24{,}165 \\ \times \quad 6 \\ \hline 144{,}990 \end{array}$$

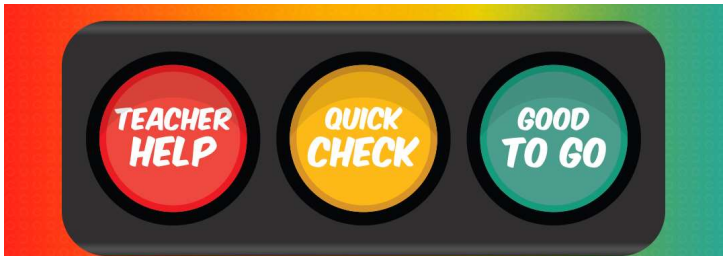
Partial Products

$$\begin{array}{r} 24{,}165 \\ \times \quad 6 \\ \hline 30 \\ 360 \\ 600 \\ 24{,}000 \\ +\ 120{,}000 \\ \hline 144{,}990 \end{array}$$

Select a method to solve the following problem:

4 times as much as 32,157

LAND (10-min) **Exit Ticket**



7

Multiply. Show or explain your strategy.

$73{,}613 \times 5$

After Exit Ticket:

Work on Problem Set
page 63 in workbook.

Small Group Time:
Page 62 workbook