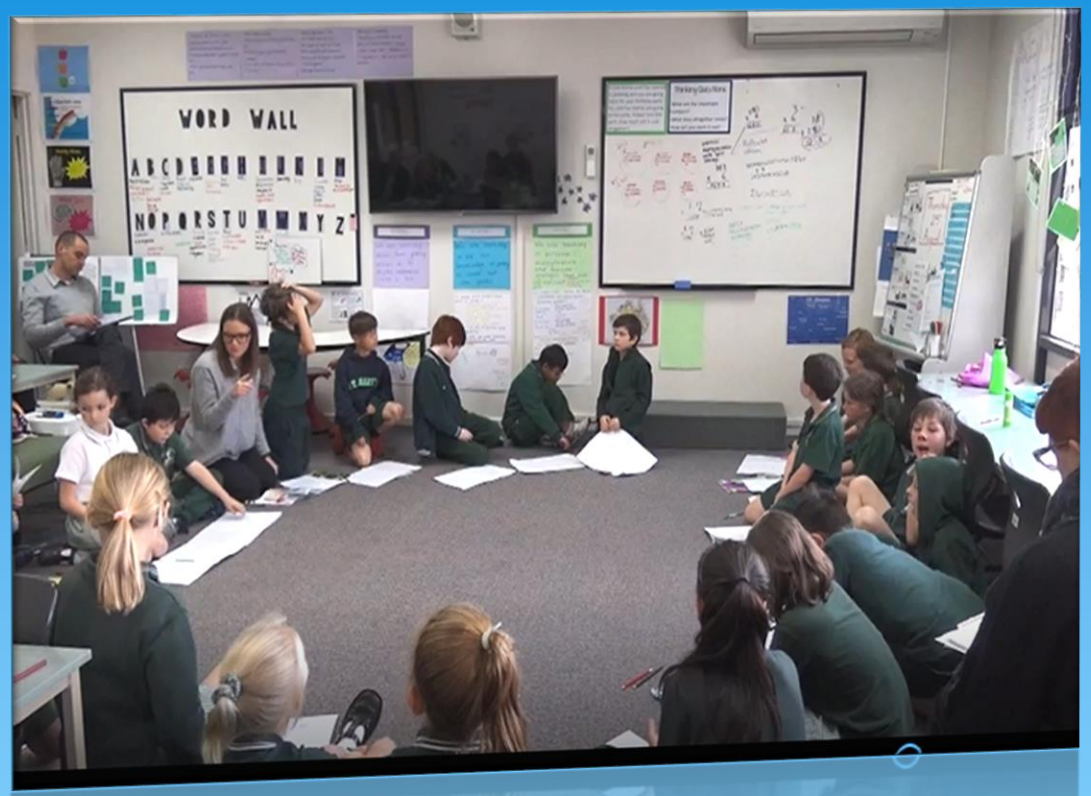


My comments focus on “the discussion section”

Did *neriage* happen ?

kneading or polishing ideas through discussion

webinar

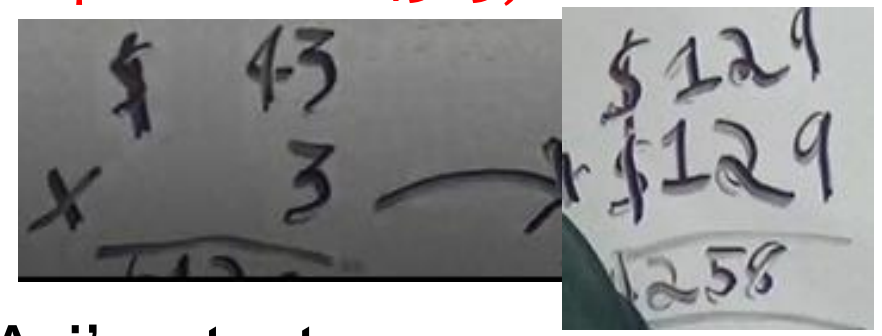
Wednesday 21 October 2020

7:00pm – 8:30pm AEDT, 5:00pm – 6:30pm JST

Toshiakira FUJII

We need to understand the background information

* 1. **Composite class**: mixture of Grade 3 and Grade 4
* 2.According to Felicity sensei, they did 2digit(11~19)×1 digit at previous lesson.
* 3. The class has not done multiples of 6, therefore **43×6 is a challenging task for students.**
* So that "complicated strategy" (halving 6 & doubling the product of 43x3) is a beautiful solution by them.
* This is a beautiful evidence to prove students are truly independent thinkers



Ari's strategy

when we talk about the lesson, we always need to consider the goal of the lesson.

Goal of the lesson :

To develop and extend the use of efficient strategies

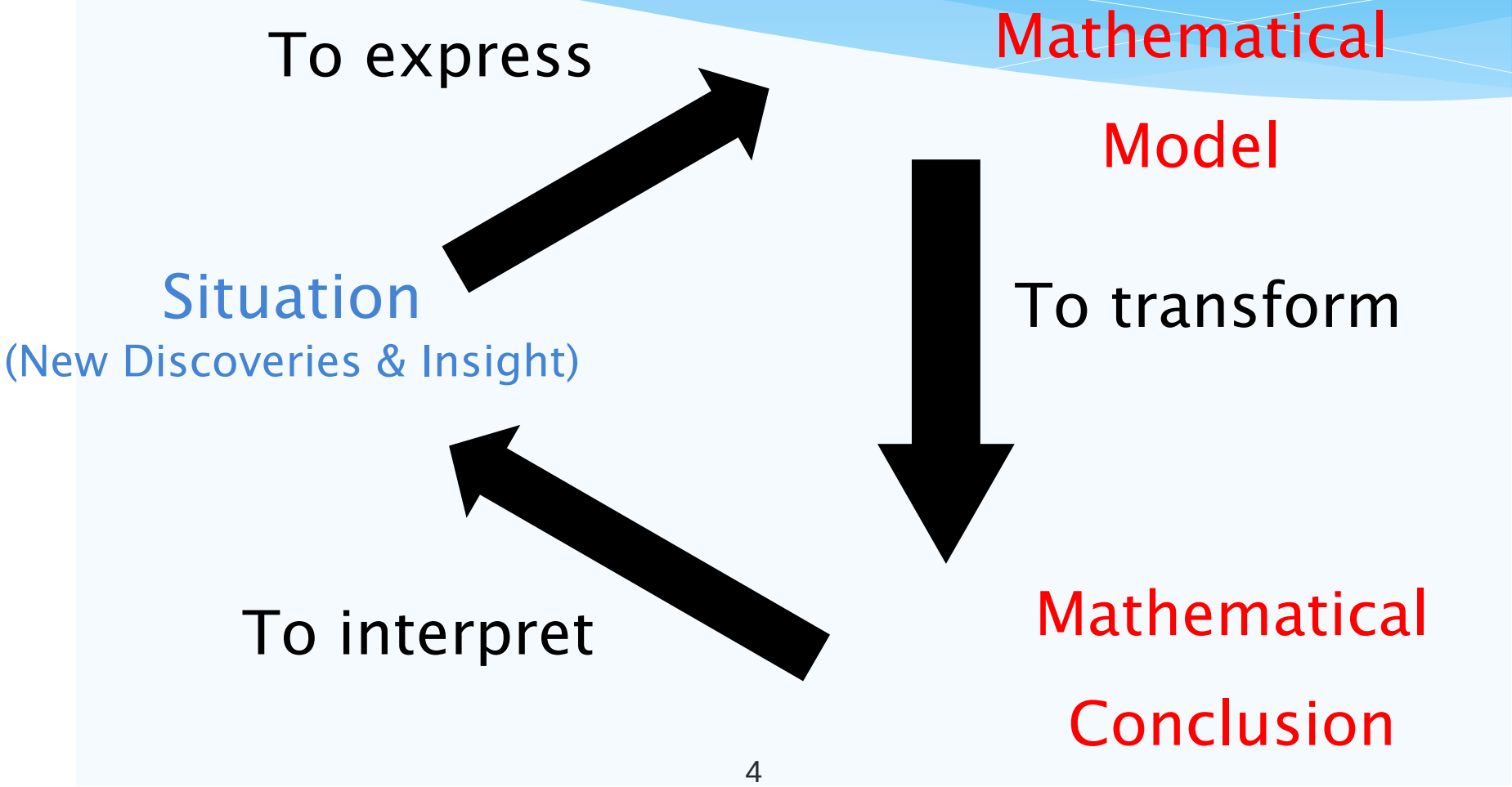
To recognize that some strategies are more efficient than others

Did discussion move forward to the goal?

* We need a bit more clearer goal
* What does it mean by “efficient strategies” and “some strategies are more efficient than others”

I am going to use the framework below:

Scheme of Use of Mathematical Expressions: Process of mathematical problem solving



The words problem is located between the situation and mathematical model

Scheme of Use of Mathematical Expressions: Process of mathematical problem solving

Situation

(New Discoveries & Insight)

A new theme park, birthday party.

To express

A new theme park has opened in Geelong and you are going there for your birthday party. You and five friends are going to the party. Tickets cost $43 each. How much will it cost altogether?

Mathematical Model

To transform

Mathematical Conclusion

To interpret

It is better to put "43 × 6" and "43+43+43+43+43+43" on the white board at the lesson

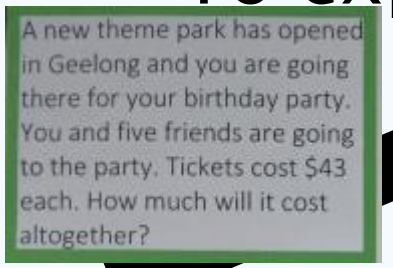
Scheme of Use of Mathematical Expressions:
Process of mathematical problem solving

Situation

(New Discoveries & Insight)

A new theme park, birthday party.

To express



43 × 6

Mathematical

43+43+43+43+43+43

Model

To transform

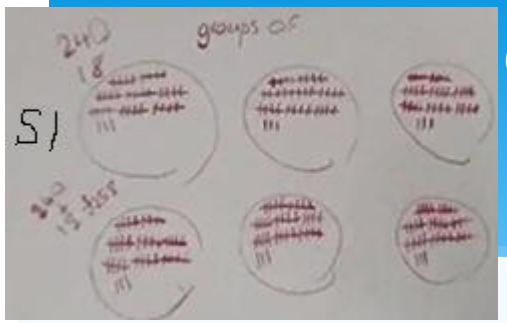
Mathe

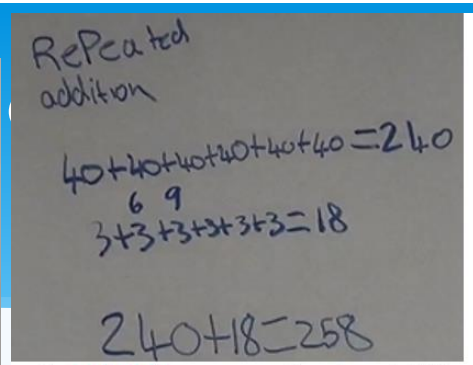
258

Conclusion

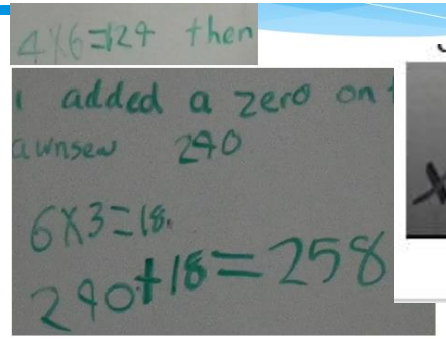
To interpret

Total cost $ 258 for six children

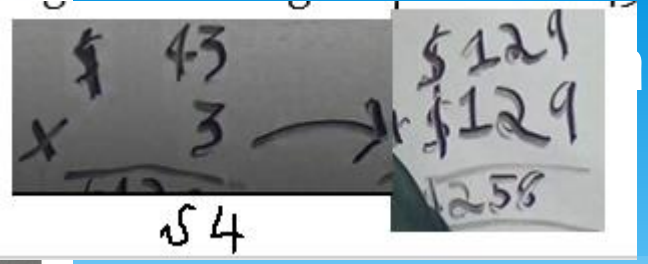


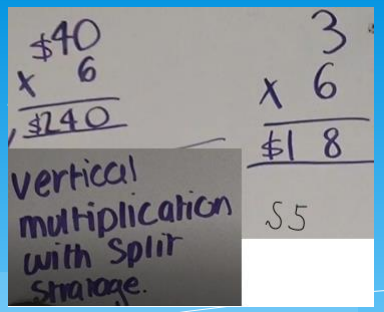


S2: *Jack* :repeated addition



S3: *Ryan* :split multiplication



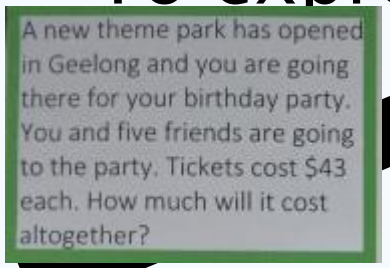


Situation

(New Discoveries & Insight)

A new theme park, birthday party.

To express



Mathematical Model

43×6

To transform

Mathematical Conclusion

258

To interpret

Total $258 for six children

Strategies (S1 to S5)are all located at the process of "To transform" .
I need another 30 minutes to explain why Stragegy1"Group of" is located at two places.

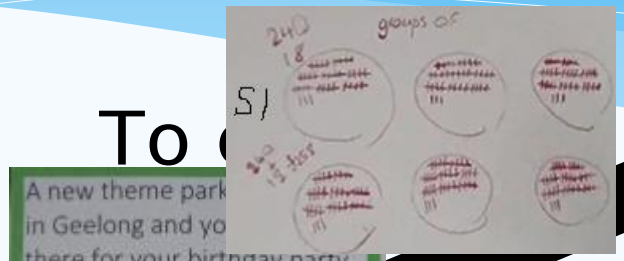
Scheme of Use of Mathematical Expressions:
Process of mathematical problem solving

Situation

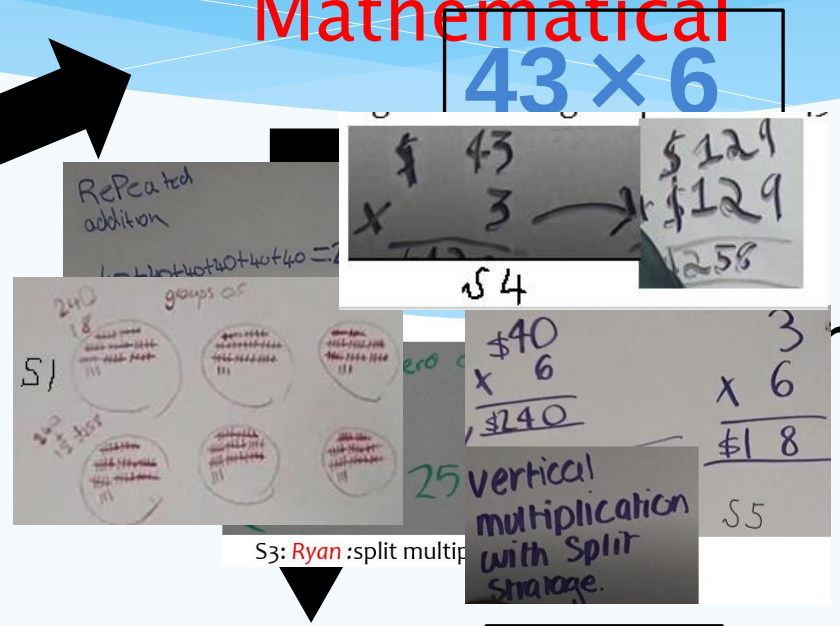
(New Discoveries & Insight)

A new theme park, birthday party.

To



Mathematical



Mathematical

258

Conclusion

To interpret

Total $258 for six children

“efficient strategies” and “some strategies are more efficient than others”

Did discussion move forward to the goal?

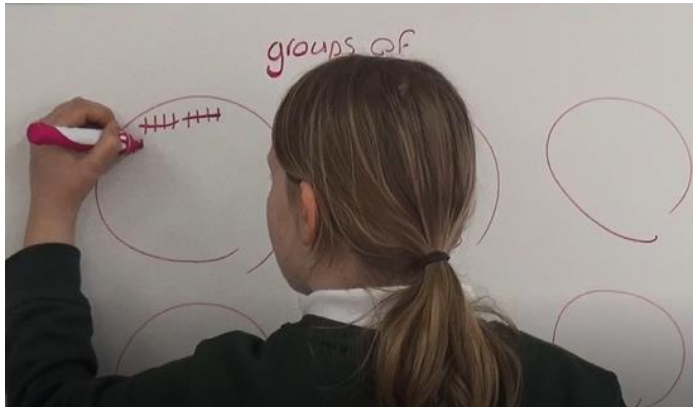
* Strategy 1 to Strategy 5 are all located at the transforming place
* That is the calculating process
* Algorithms !
* We should not forget the lesson started from daily life situation
* Did discussion move forward to think about “some strategies are more efficient than others” ?
* Was discussion beyond Show and Tell?
* Did *Nariage* happen at discussion section?

What is the neriage ?
It should be an actualization of ZPD

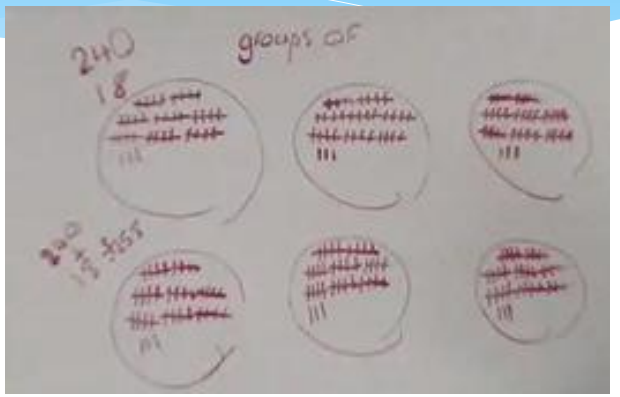
* Neriage is beyond “Show and Tell”
* Although rather a classic citation, **neriage should be an actualization of** Vygotsky’s zone of proximal development
* Therefore, during neriage, teachers must see the students’ potential as high as possible and help them move toward their potential from what they came up on their own, i.e., what they can do without help.

The first *Neriage* occurred in six minutes [27:18] to [33:36] and was discussed by students in Elise's diagram.

It is an actualization of Communities of Inquiry (see Susie sensei's slide)

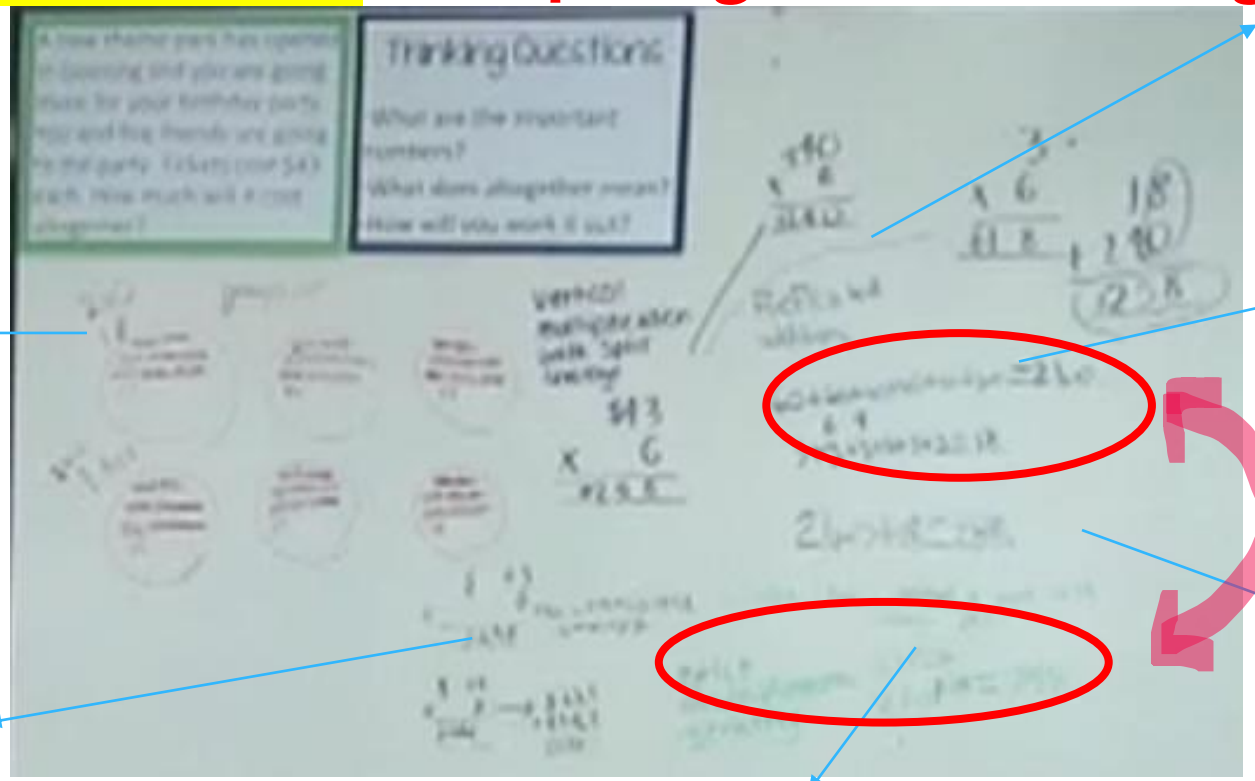


S4: Elise? Why did you do "groups of"?
Elise: Because it was just one of the strategies that I selected. Yeah, that's why I did it.
S4: But it's not the most efficient.
Elise: I know it's not, but I just wanted to keep it straight forward.
Max: Did you use the tally marks…
Elise. Yes, I did, because that's more efficient than using just, like, strokes.
Elana: Why did you use six groups?
Elise: Because there's six people.
Jack: Elise, why didn't you do just one group and times it by six, because it would've been much quicker than this way.
Elise: Well, I didn't think to do that, so….
T: It might be difficult for some people to do that, too. Jack, sometimes people need to see something visually, and be able to use that and count out things like their thought on the board.



Another *Neriage* is identified by Wanty sensei

From Wanty sensei PP **"Comparing and contrasting"**



S5: Vertical multiplication with a split strategy

S1: Groups of

S2: repeated addition

40+40+40+40+40+40 = 240

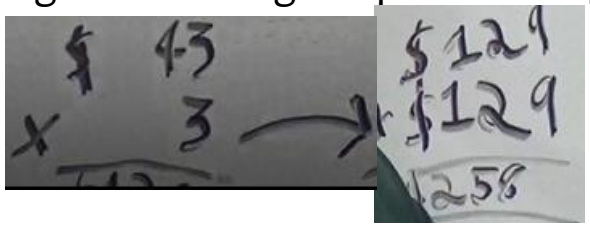
3+3+3+3+3+3 = 18

240+18 = 258

24+0??

Why did you add the zero?

S4: "complicated strategy"
(halving 6 & doubling the product of 43x3)



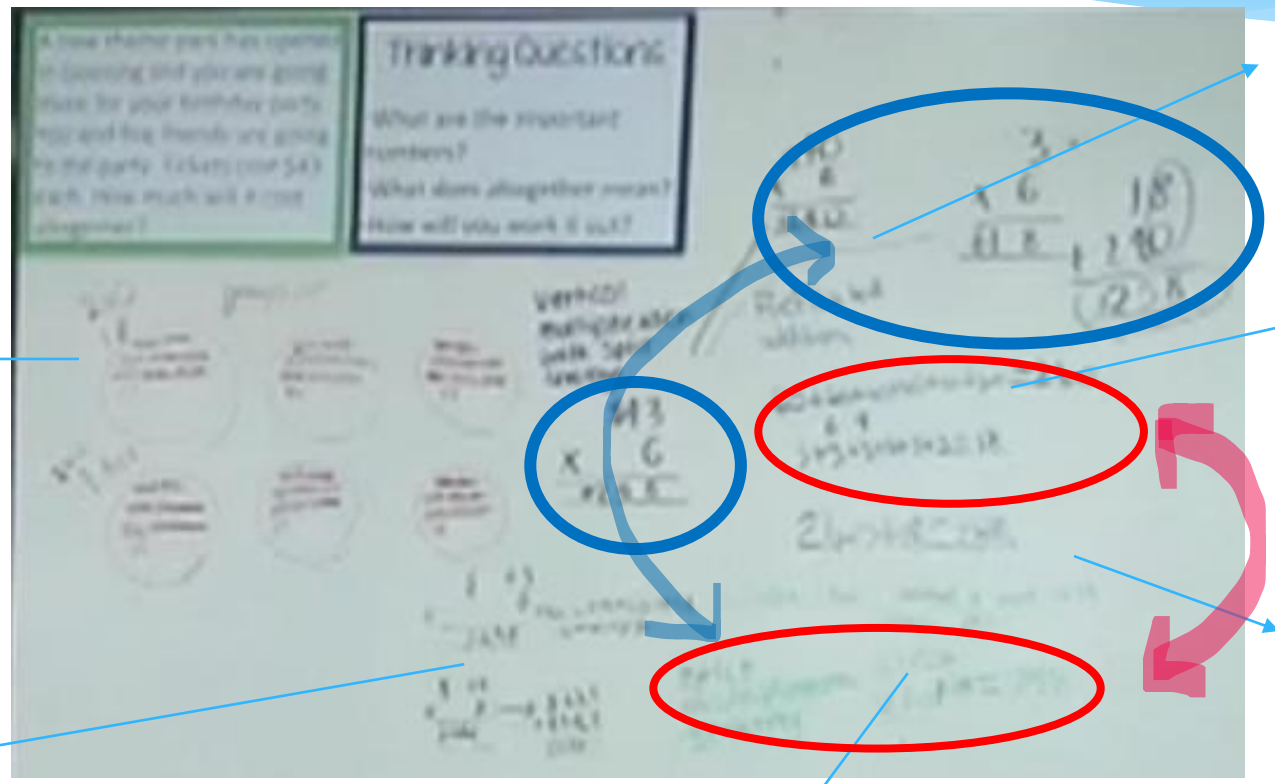
S3: split multiplication strategy

4x6 = 24 then I *added a zero* on the answer 240.

6x3 = 18

240+18 = 258

Another *neriage*? Another possible place for discussing on efficiency: that is between S3 and S5



S5: Vertical multiplication with a split strategy

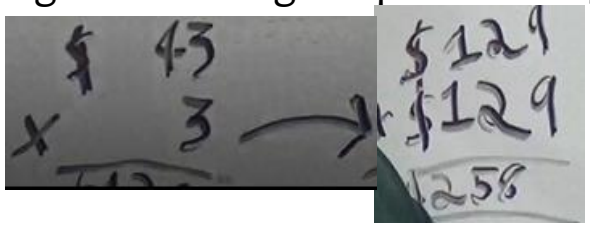
S2: repeated addition
40+40+40+40+40+40 = 240
3+3+3+3+3+3 = 18
240+18 = 258

S1: Groups of

24+0??

Why did you add the zero?

S4: "complicated strategy"
(halving 6 & doubling the product of 43x3)



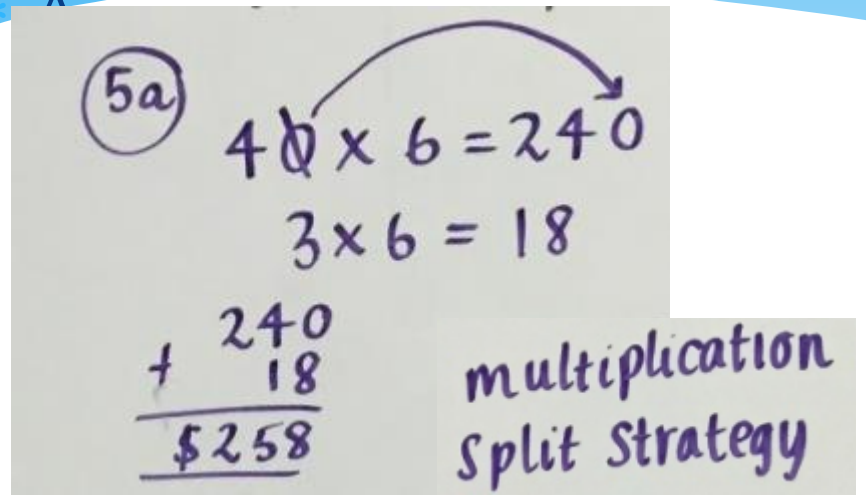
S3: split multiplication strategy

4x6 = 24 then I *added a zero* on the answer 240.
6x3 = 18
240+18 = 258

Neriage(a colloquial term):
kneading or polishing ideas through discussion

* To do this *neriage*, we may need an additional component

we may need an additional component between 5ab(split strategy) and 6(vertical multiplication)



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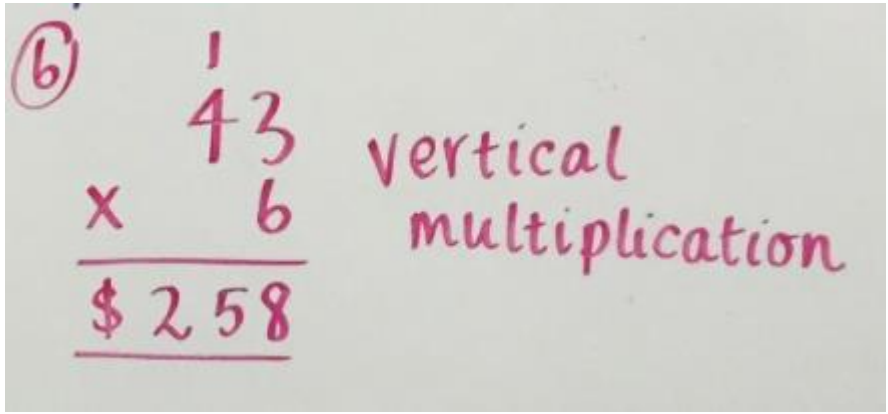
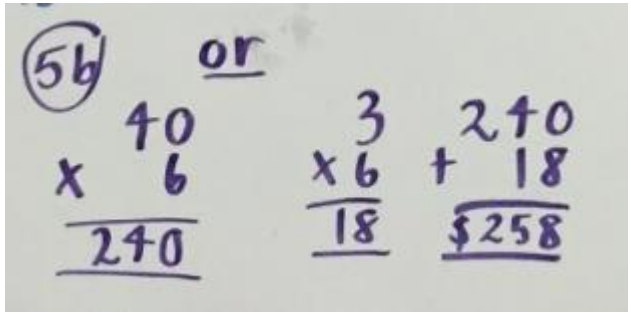
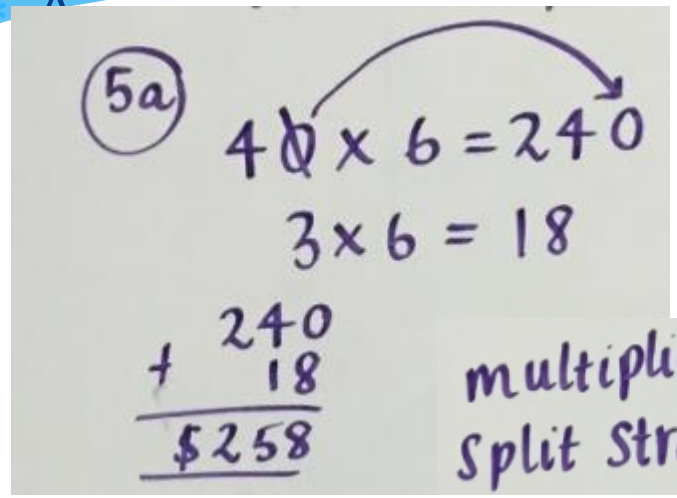
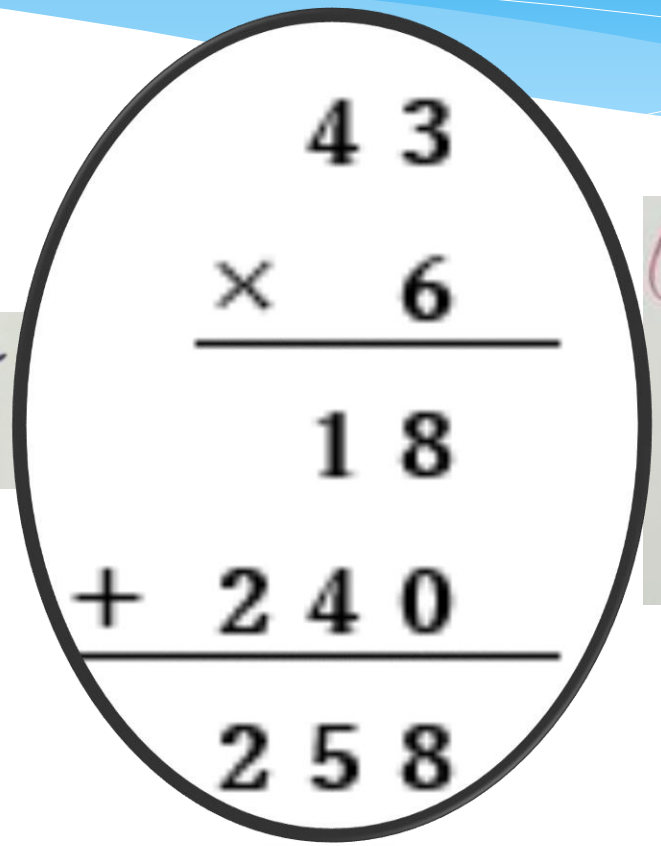


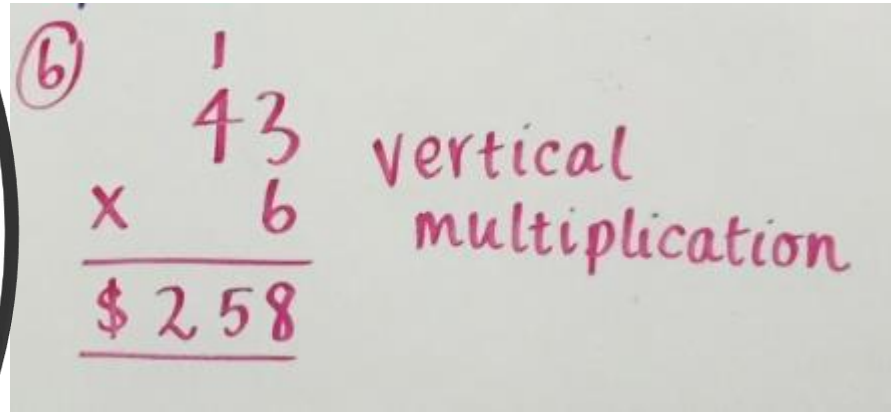


That is the **longer version of vertical multiplication**

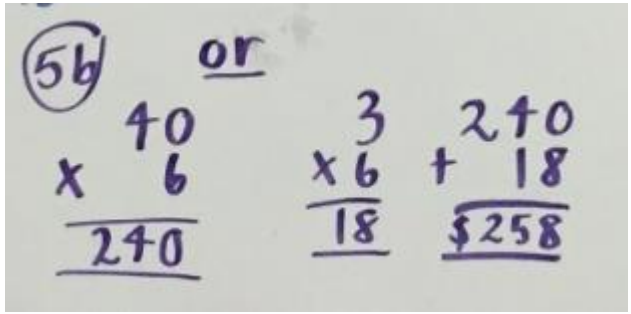


multiplication
split strategy





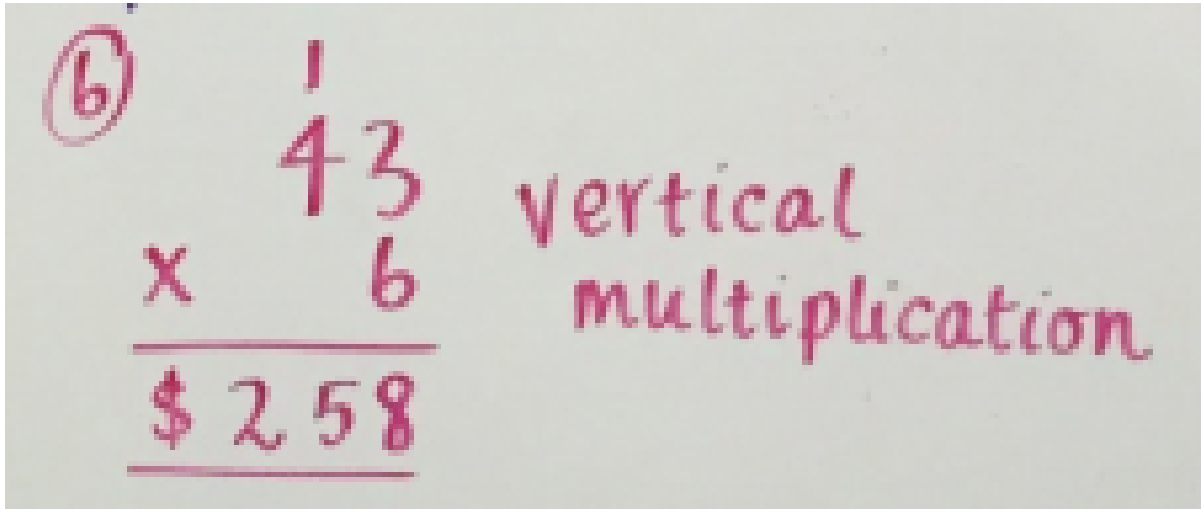
vertical
multiplication

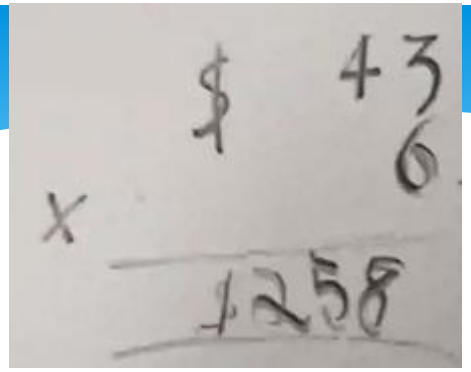


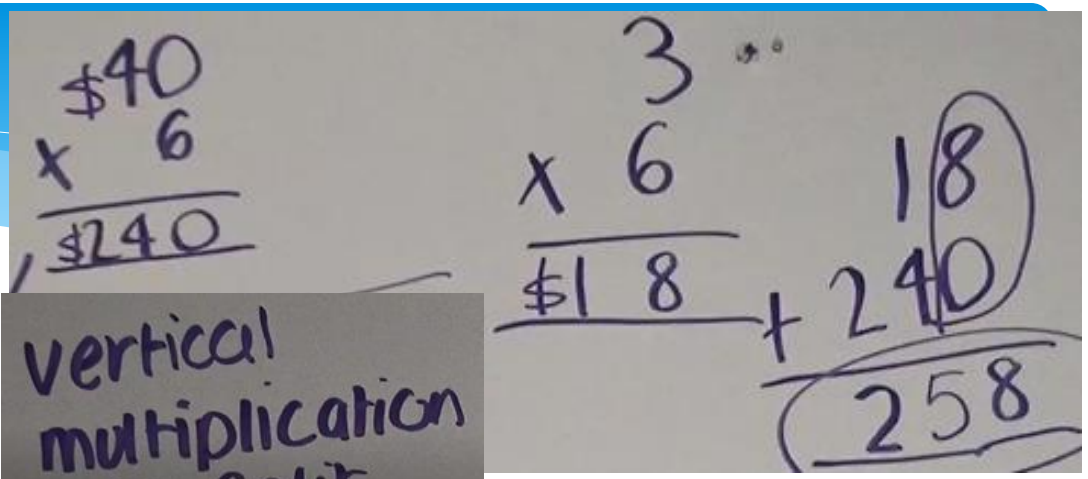
Longer version of vertical multiplication

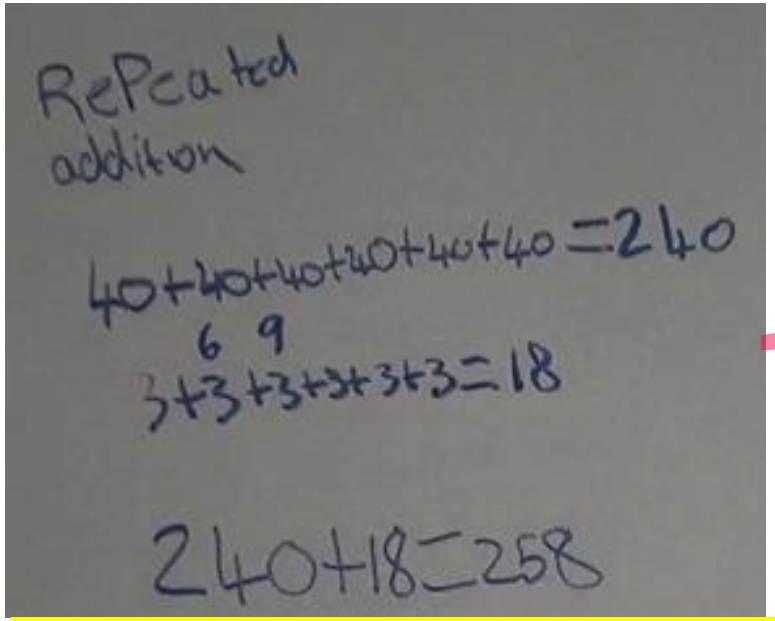
$$
\begin{array}{r}
43 \\
\times \quad 6 \\
\hline
18 \\
+\ 240 \\
\hline
258
\end{array}
$$

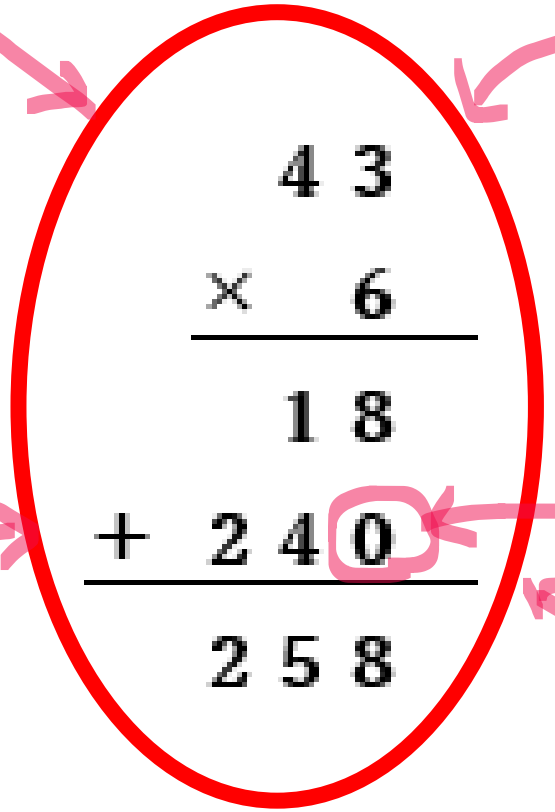
Shorter version of vertical multiplication





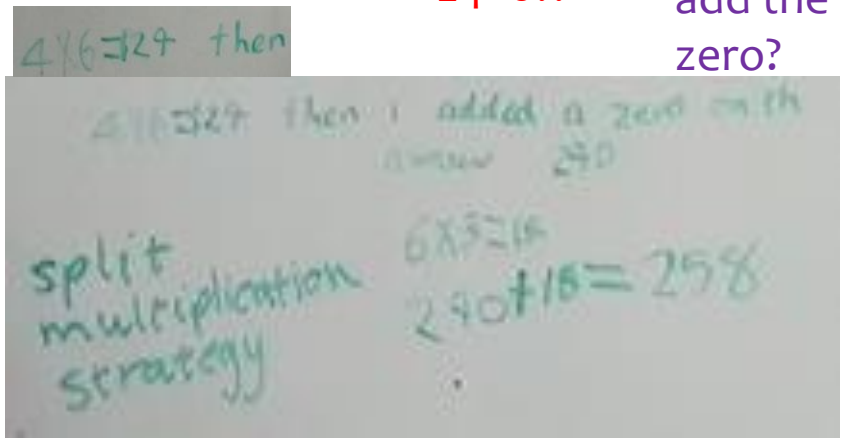




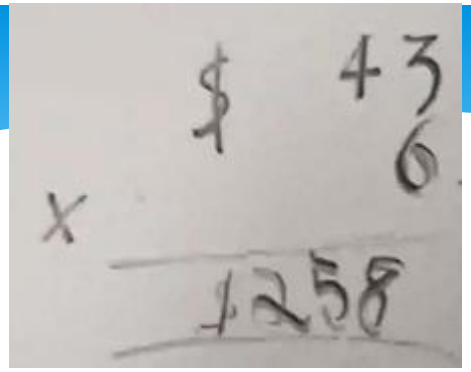


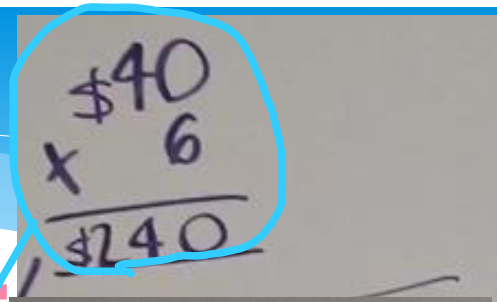
24+0??

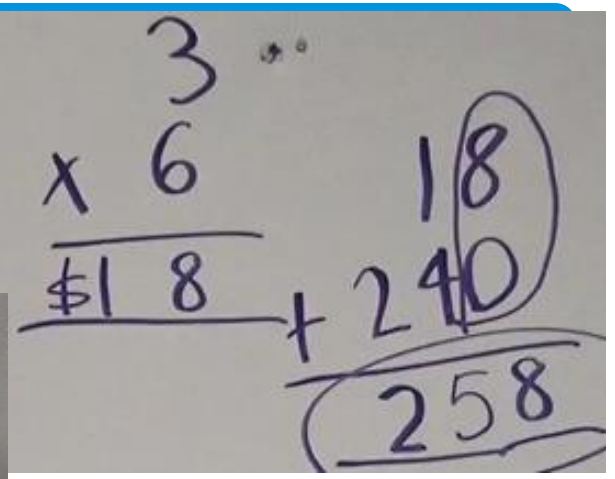
Why did you add the zero?

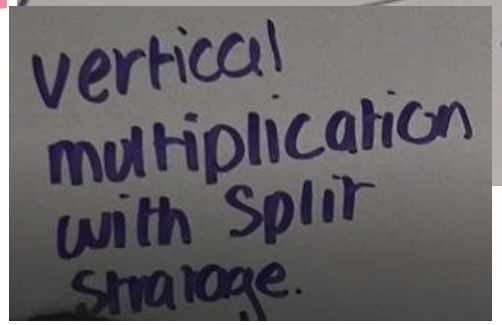


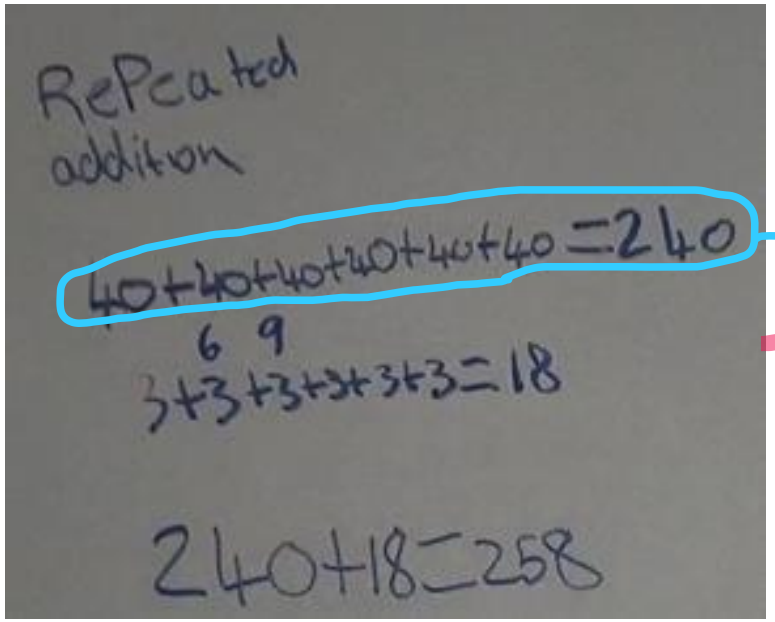
Through introducing the long version of multiplication strategy, strategies given by students can be integrated into the long version of vertical multiplication

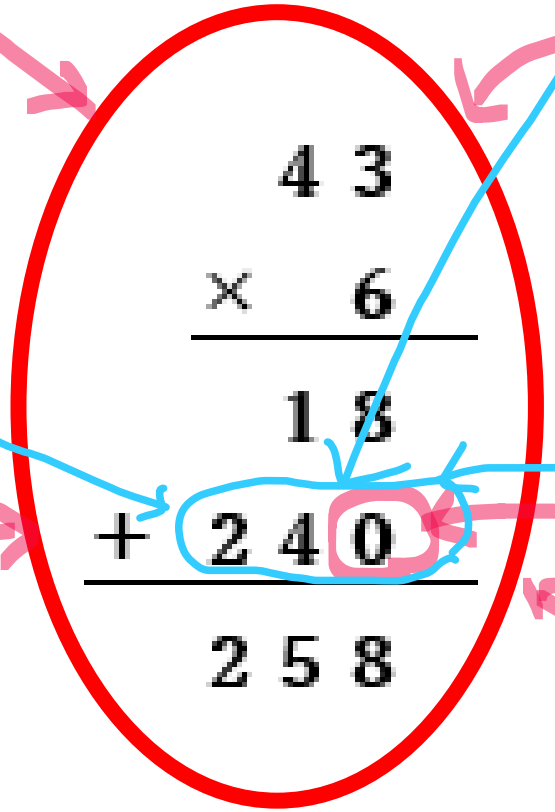


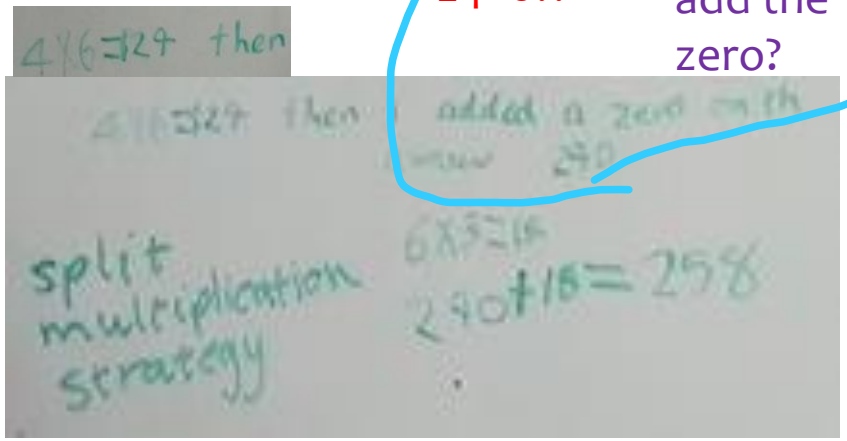












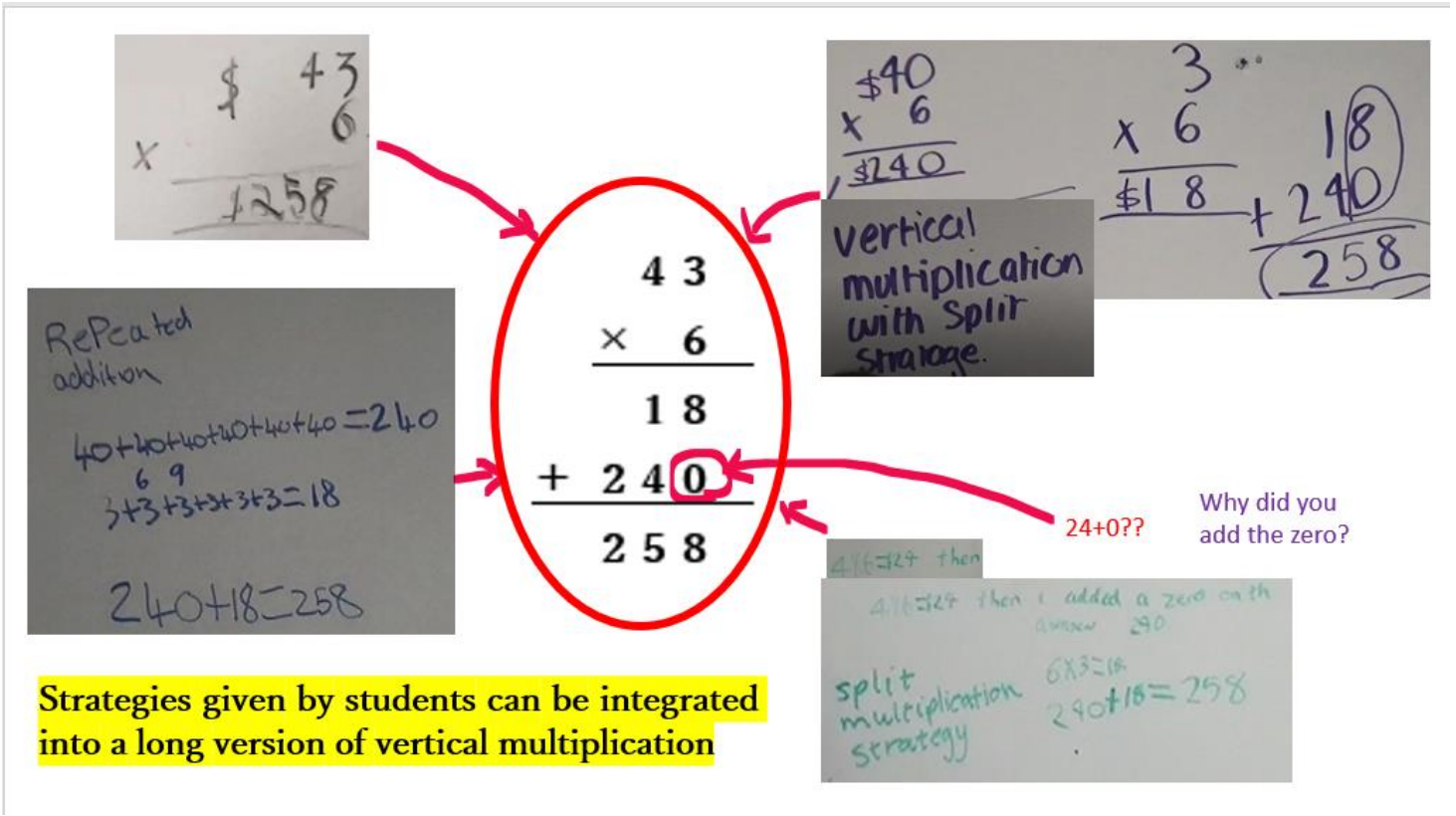
24+0??

Why did you add the zero?

Why did you add the zero? 24+0?

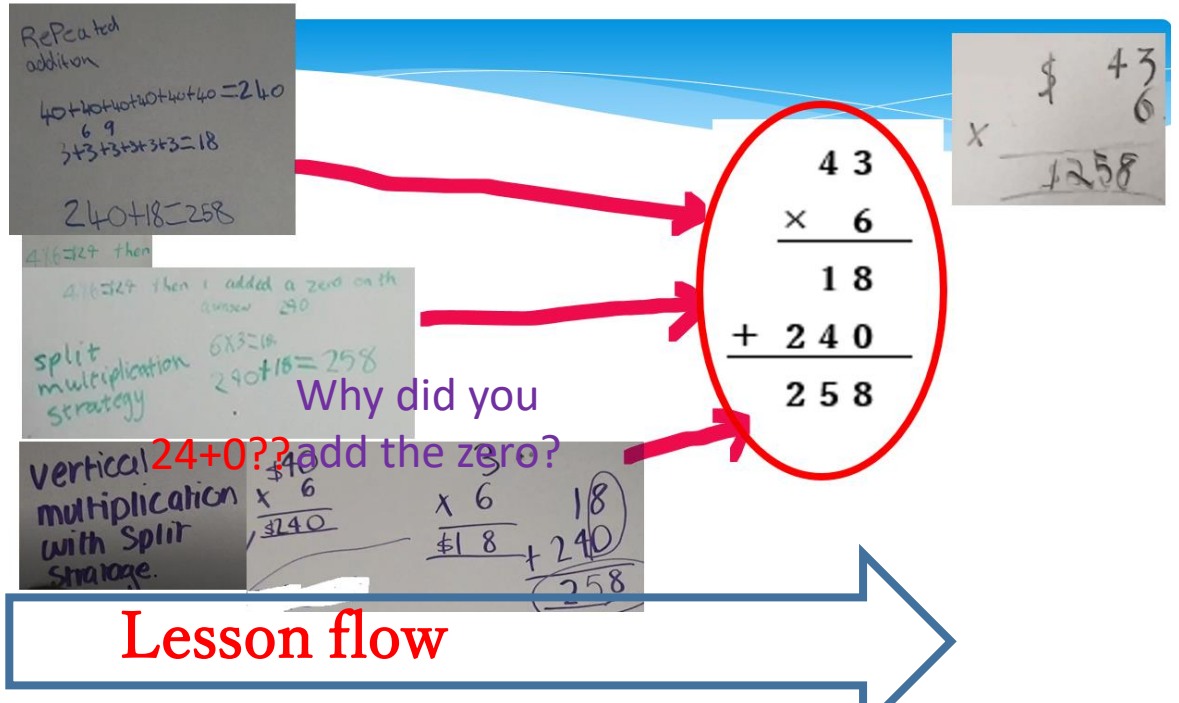
Strategies given by students can be integrated into a long version of vertical multiplication

Algorithms should not be taught without understanding. Therefore the direction of the arrow is important, it is from strategies (S1 to S5) to formal algorithm, but not the other way around.

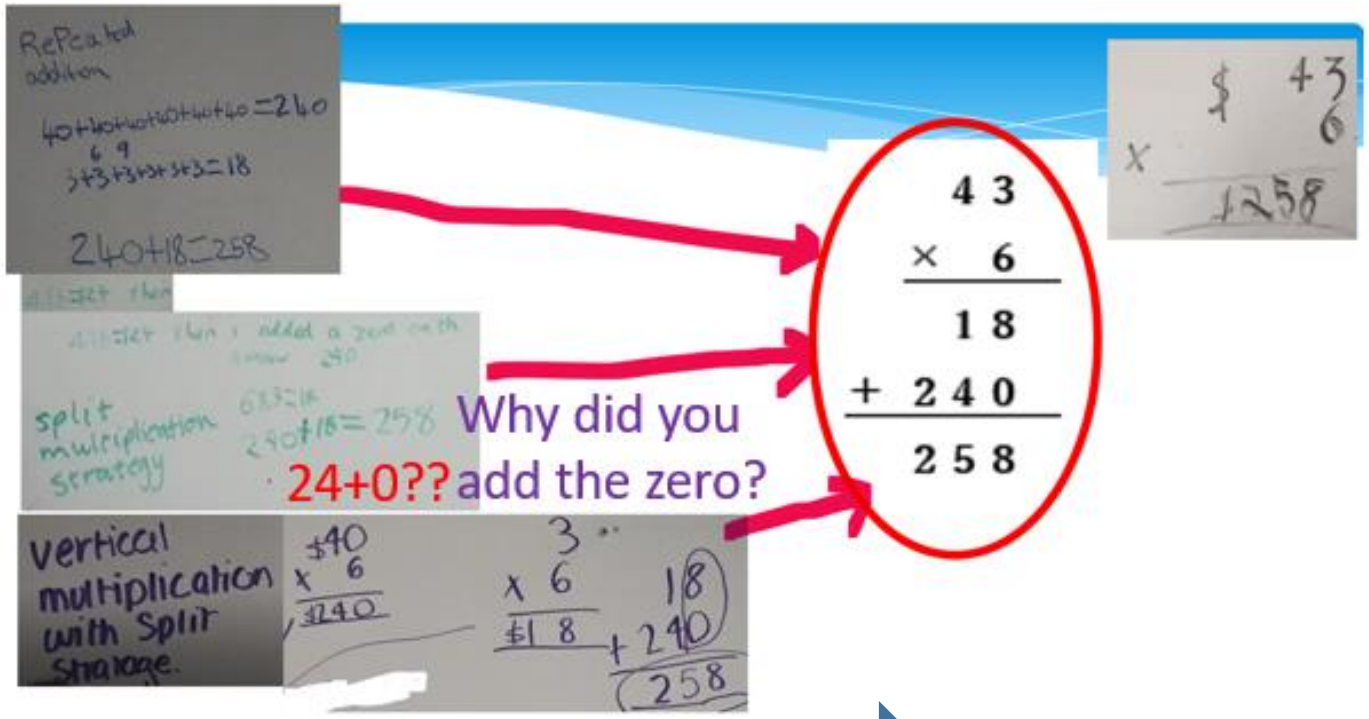


Because, an algorithm should not be following some procedure without any understanding.

- Lesson flow is from students' strategies to the formal algorithm.
- Felicity sensei's lesson ended just before the algorithm. Never mind, it's okay.
- Because the lesson flow is appropriate, so that this is a good lesson in terms of teaching of algorithms

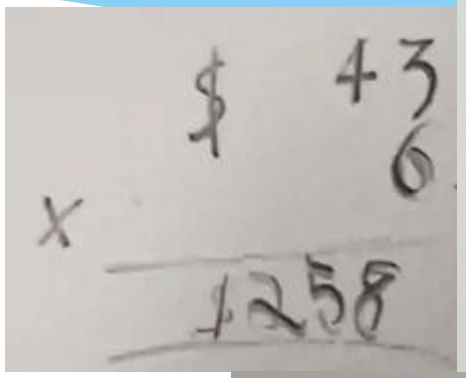


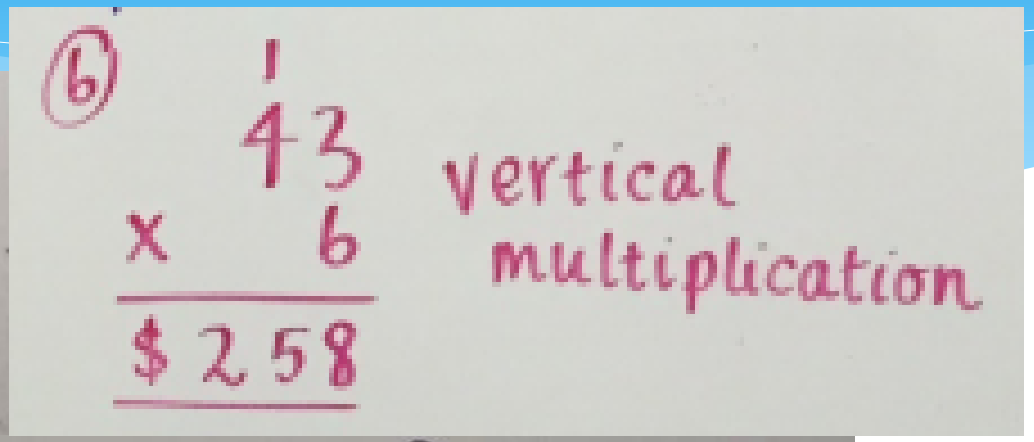
In other words, although the lesson could be an appropriate place to introduce the long vertical multiplication algorism, it should be okay in the next lesson or later lessons, as far as students can recall their strategies (S1 to S5)

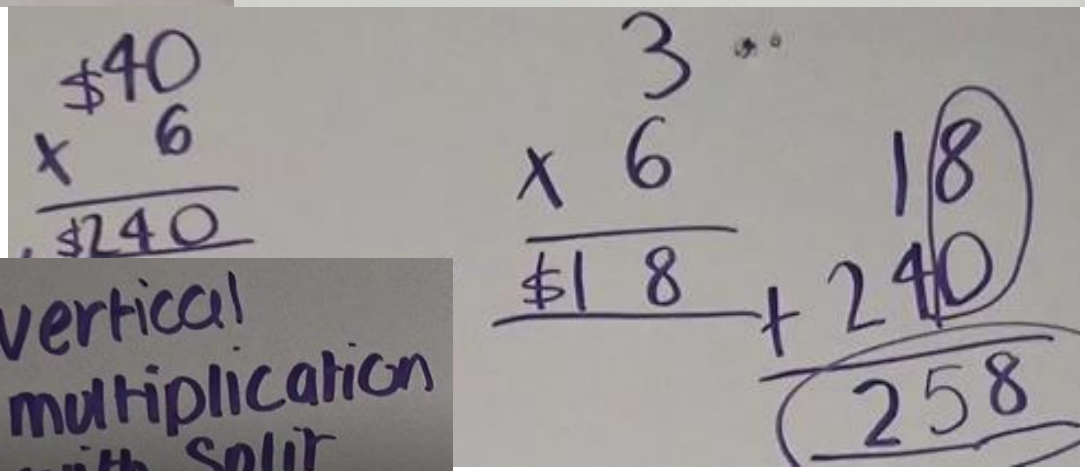


Anyhow, why do we teach algorithms, then ?

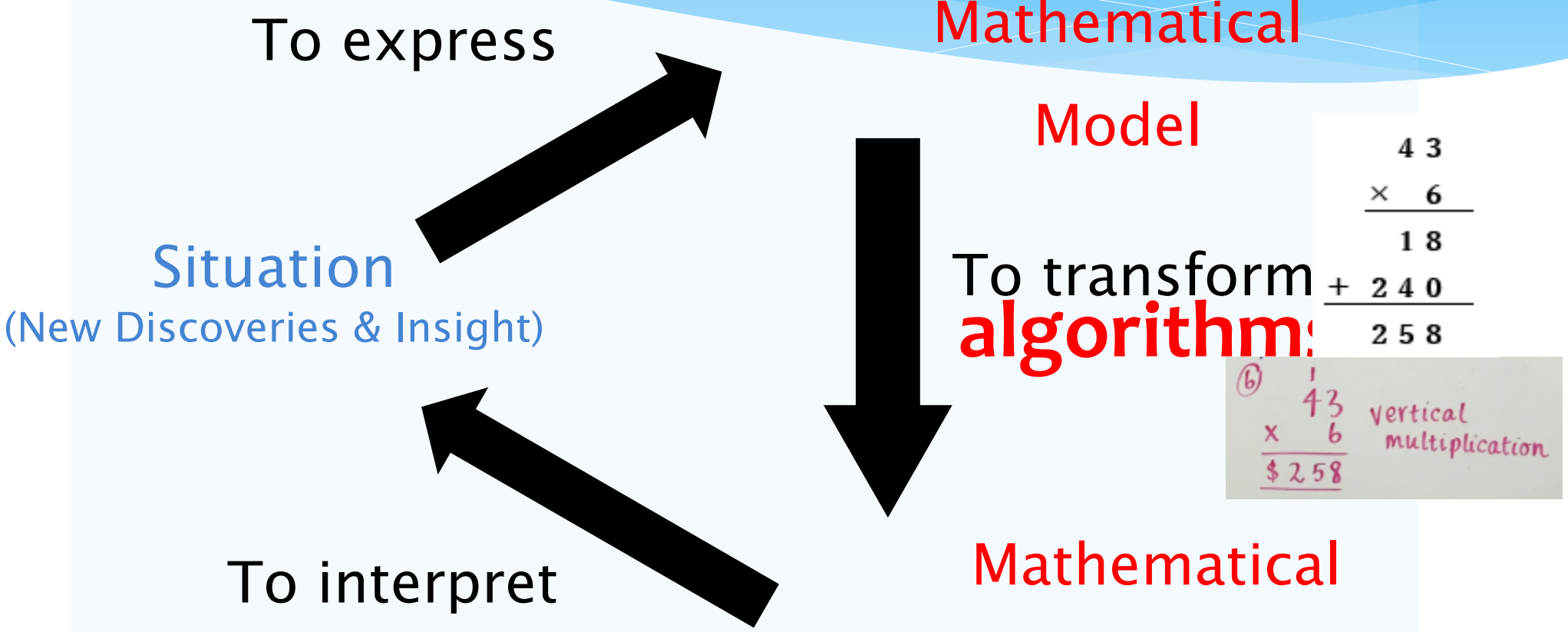
$$
\begin{array}{r}
43 \\
\times \quad 6 \\
\hline
18 \\
+\ 240 \\
\hline
258
\end{array}
$$







Algorithms are located at the transforming process



Why do we teach algorithms ?
Even we could use a calculator (an abacus?)

To express

Mathematical

Mo

Situation

(New Discoveries & Insight)

To interpret

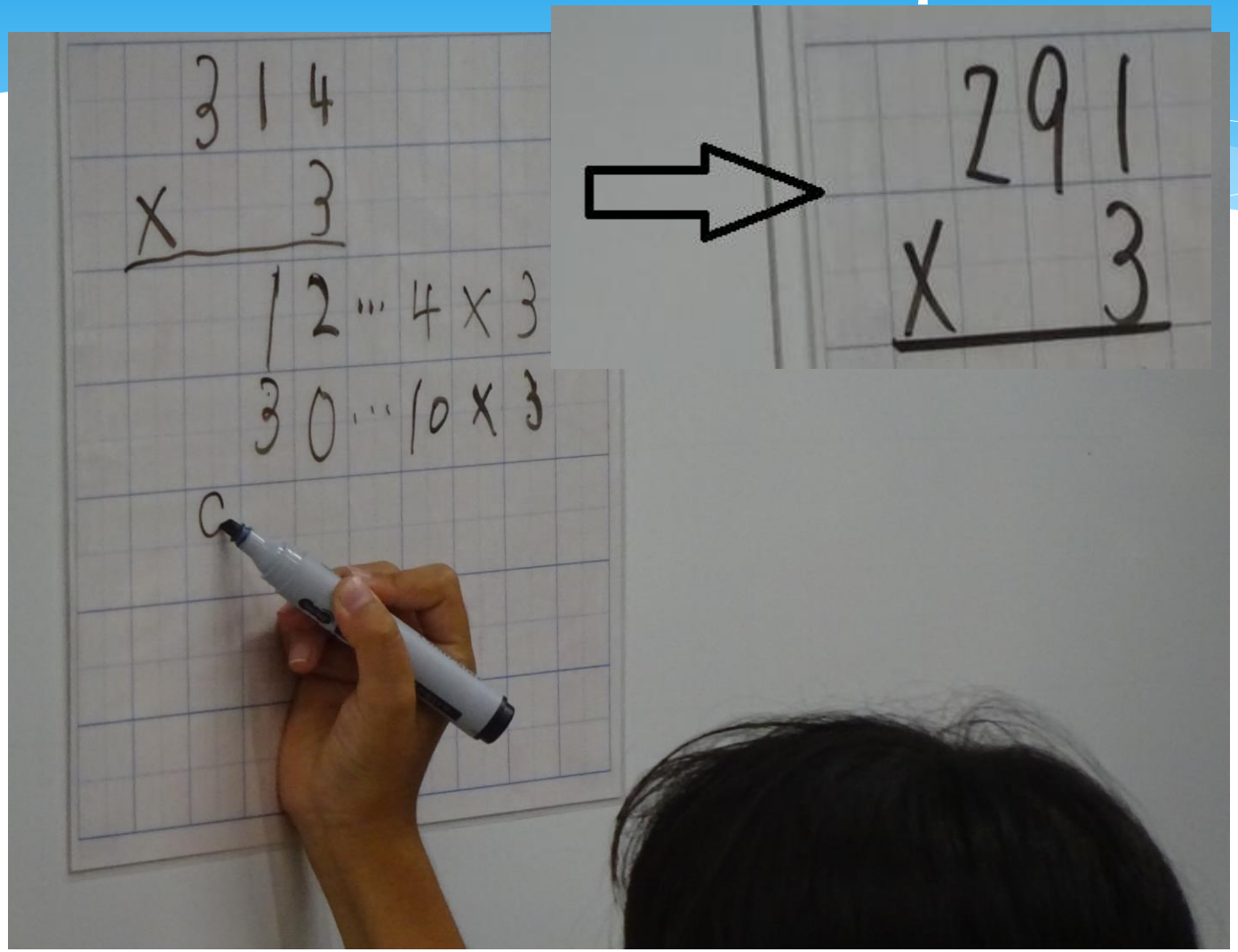
Mathematical

Conclusion

why do we learn algorithms?

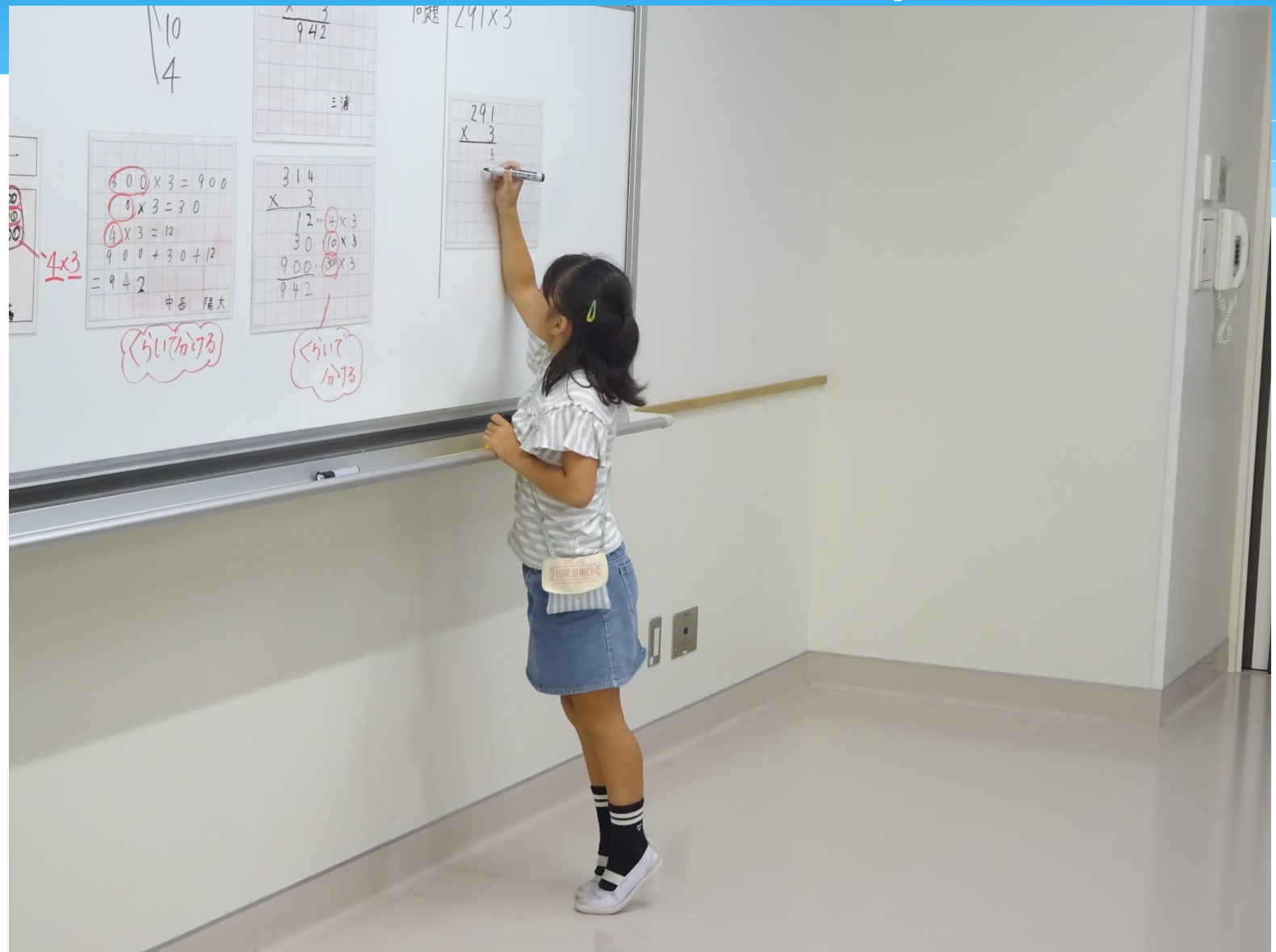
* Calculators : we can NOT see the process of calculation
* **Algorithms : we can see the process of calculation**
* If we do some mistakes, we can see where it is, we can see the reason why we did mistake
* Algorithms allow us to diagnosis which parts are inappropriate and we could correct the mistakes by our selves

Screen shouts from .Japanese research lesson

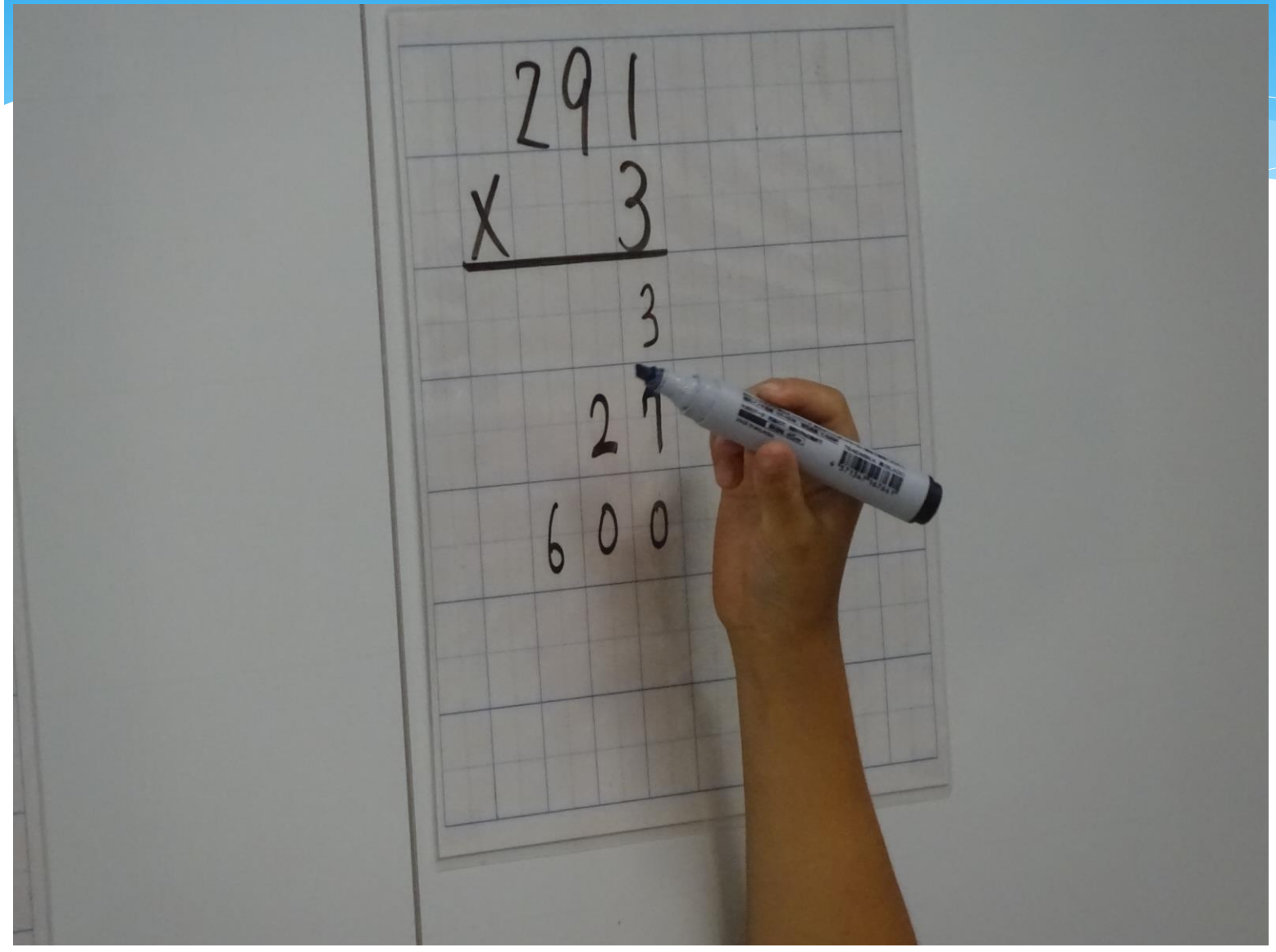


* The task is 314×3
* At the end of the lesson, students apply to 291×3

A girl came to the front to explain her solution

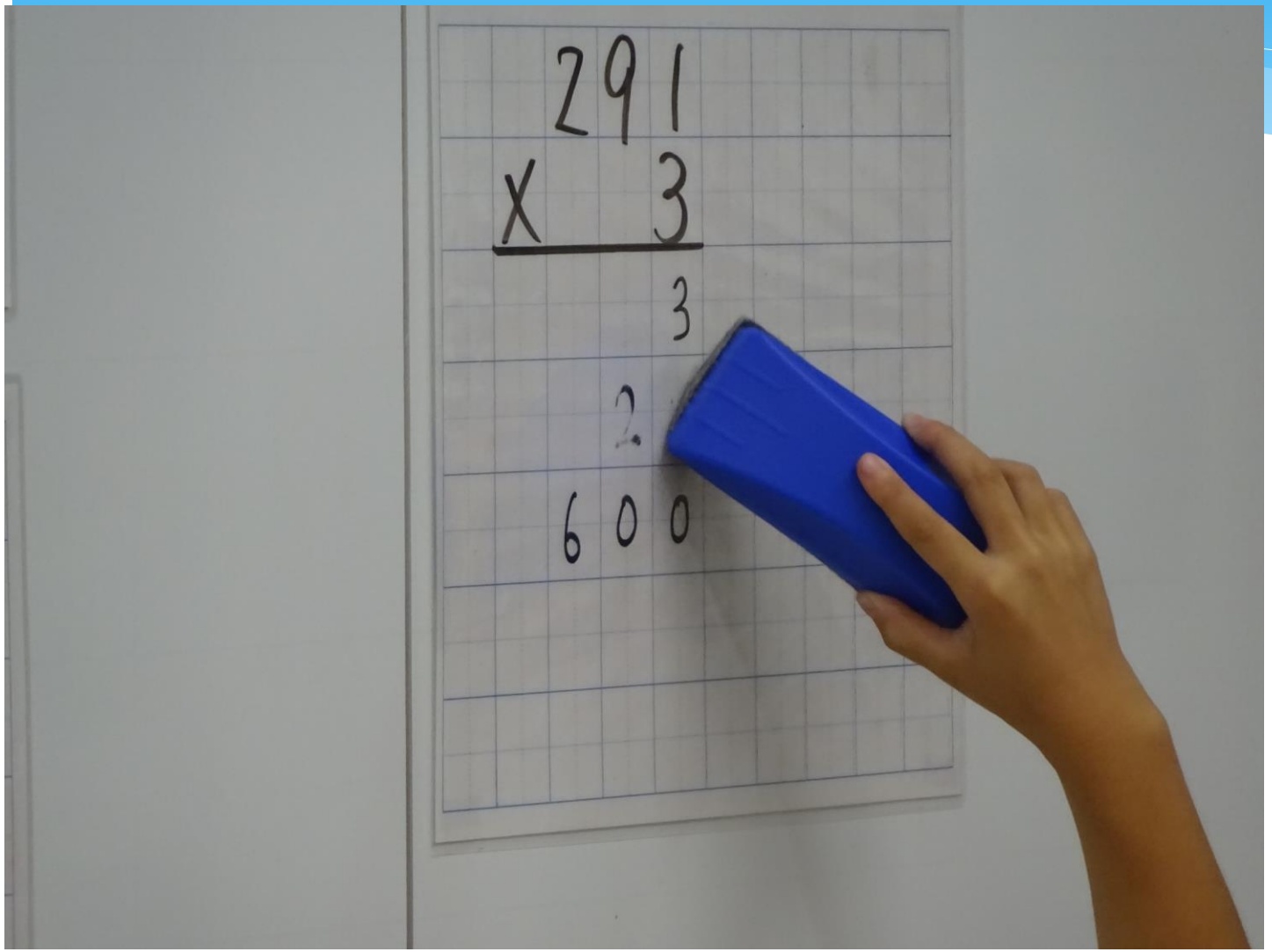


A girl came to the front to explain her solution



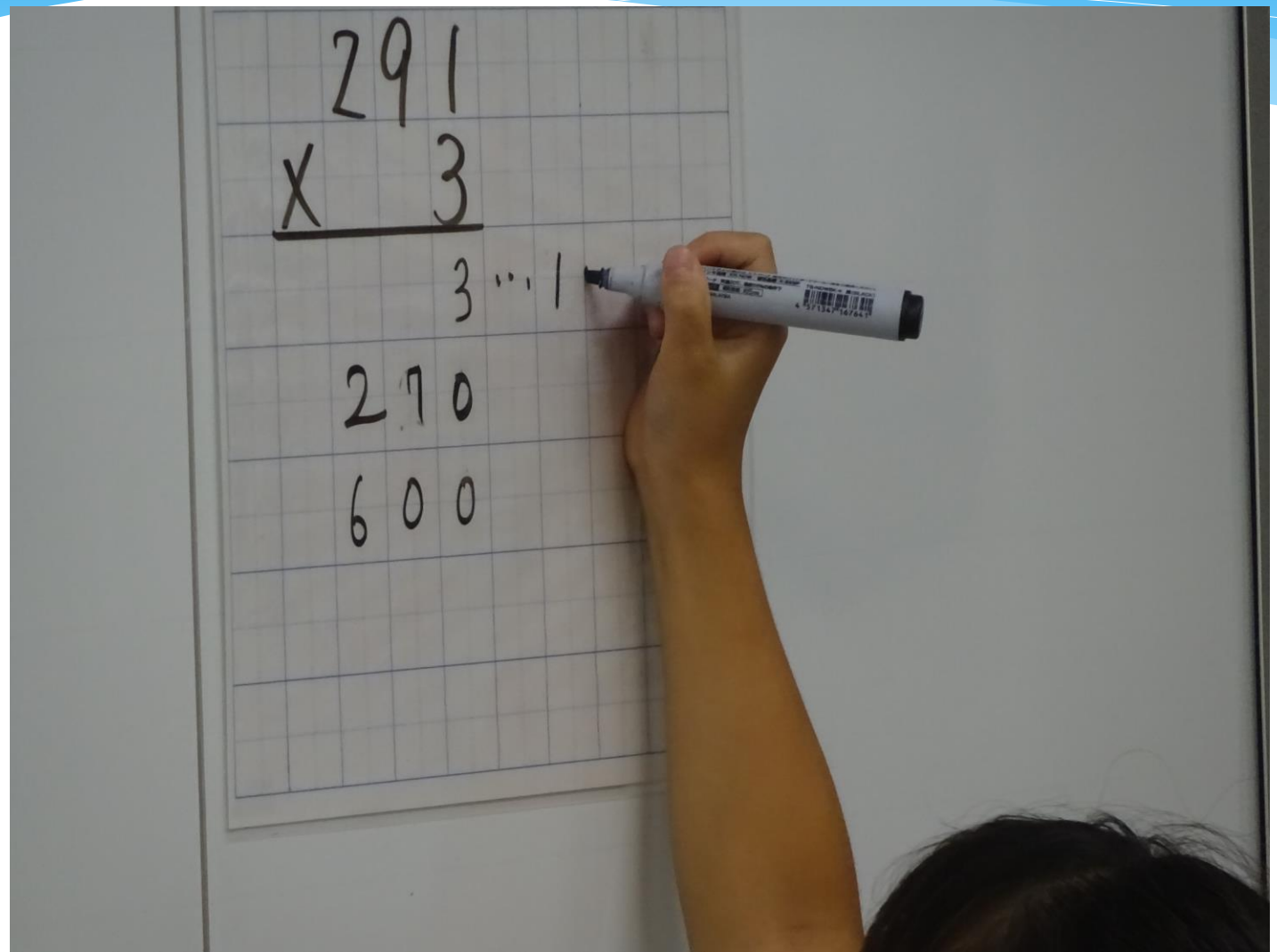
* She put "27"
* Classmates stared at her movements with silence.

A girl came to the front to explain her solution



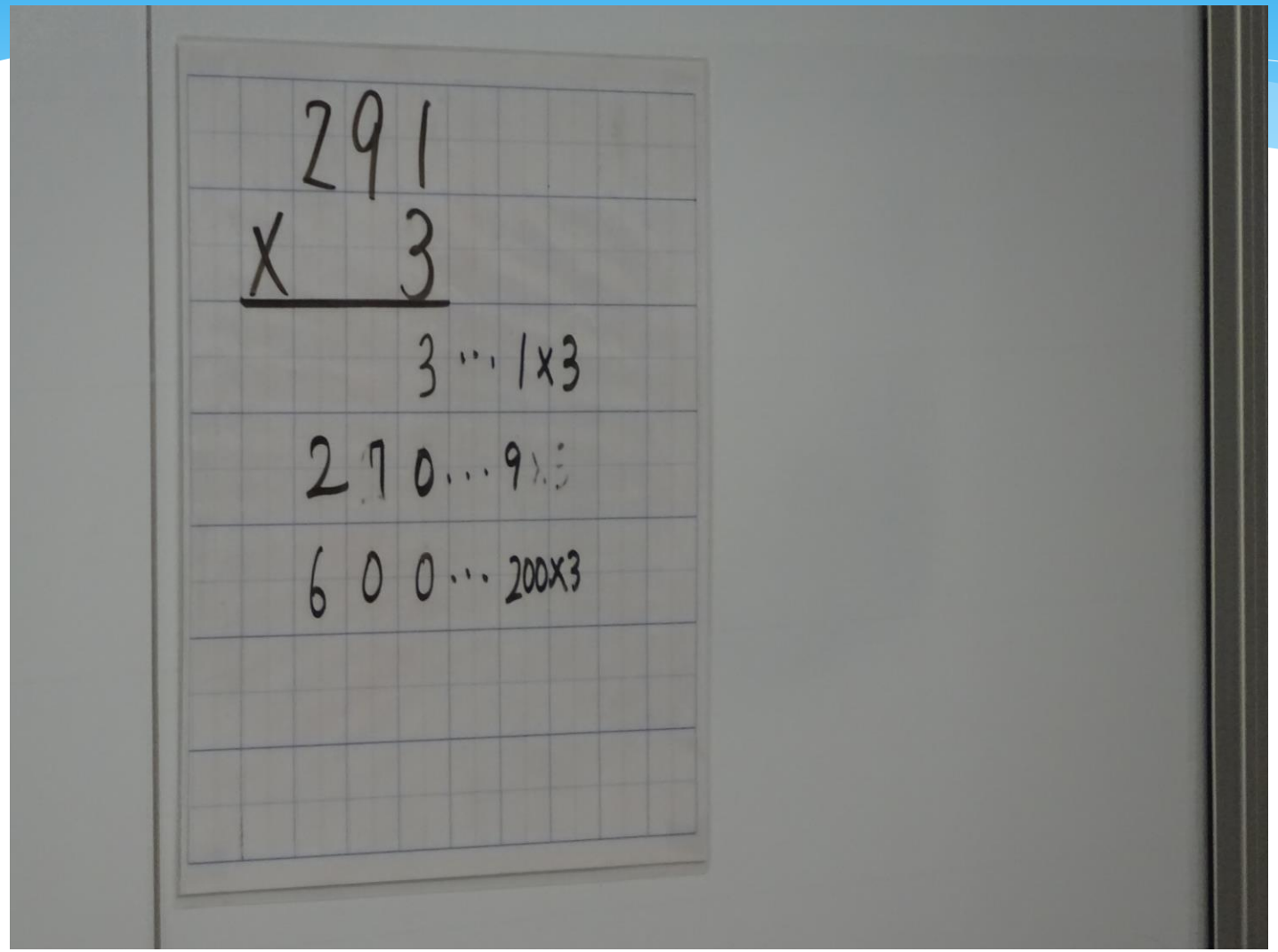
* She erased "27" out
* Classmates still stared at her movements with silence.

A girl came to the front to explain her solution



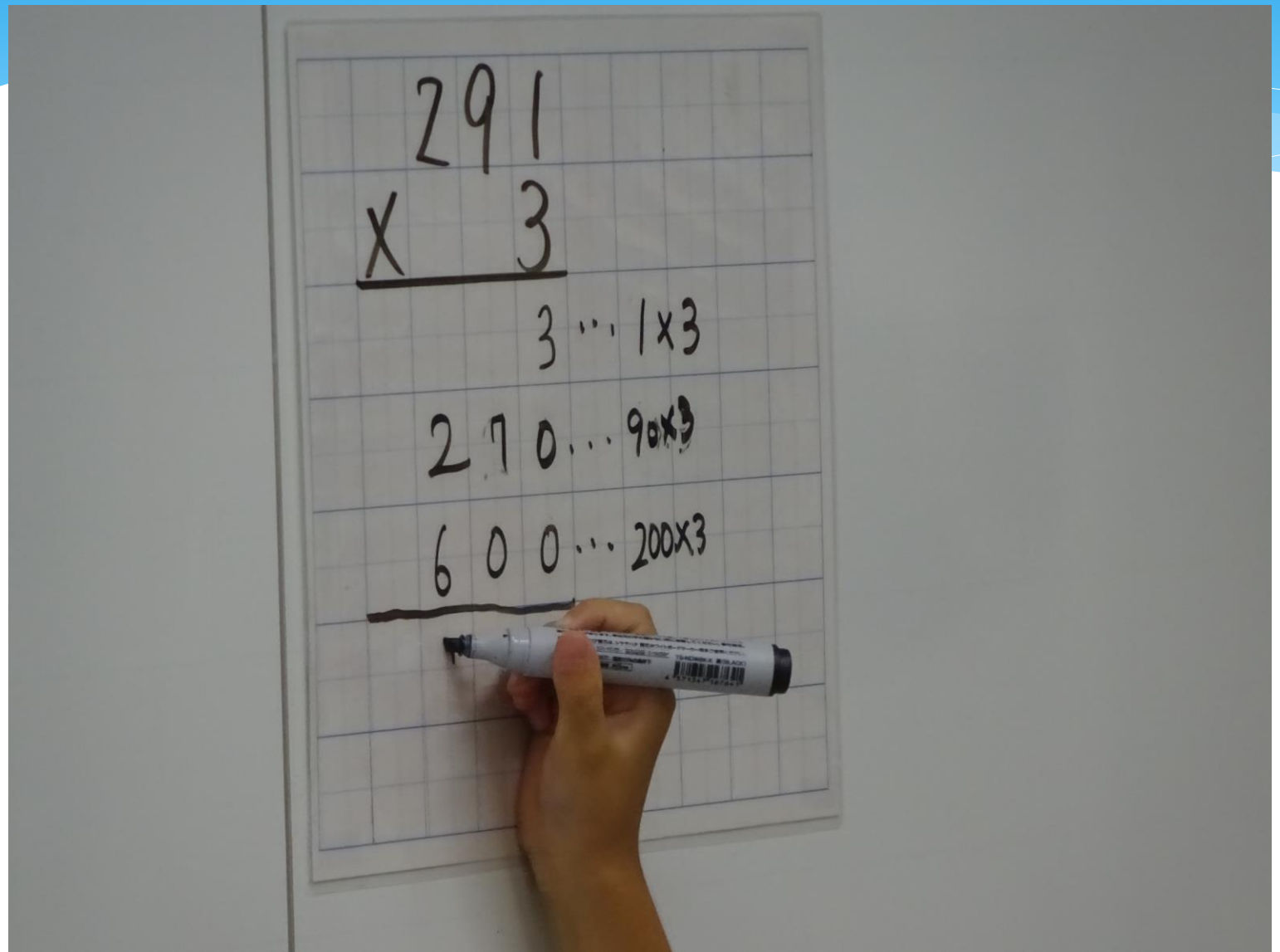
* She put “270”
* And going to write reasons for numbers in right side

A girl came to the front to explain her solution



* Indeed, 270 is not 9 times something, but…

A girl came to the front to explain her solution



* She put 270 and 90 × 3

A girl came to the front to explain her solution

* “How was my work?” Classmates clap their hands.

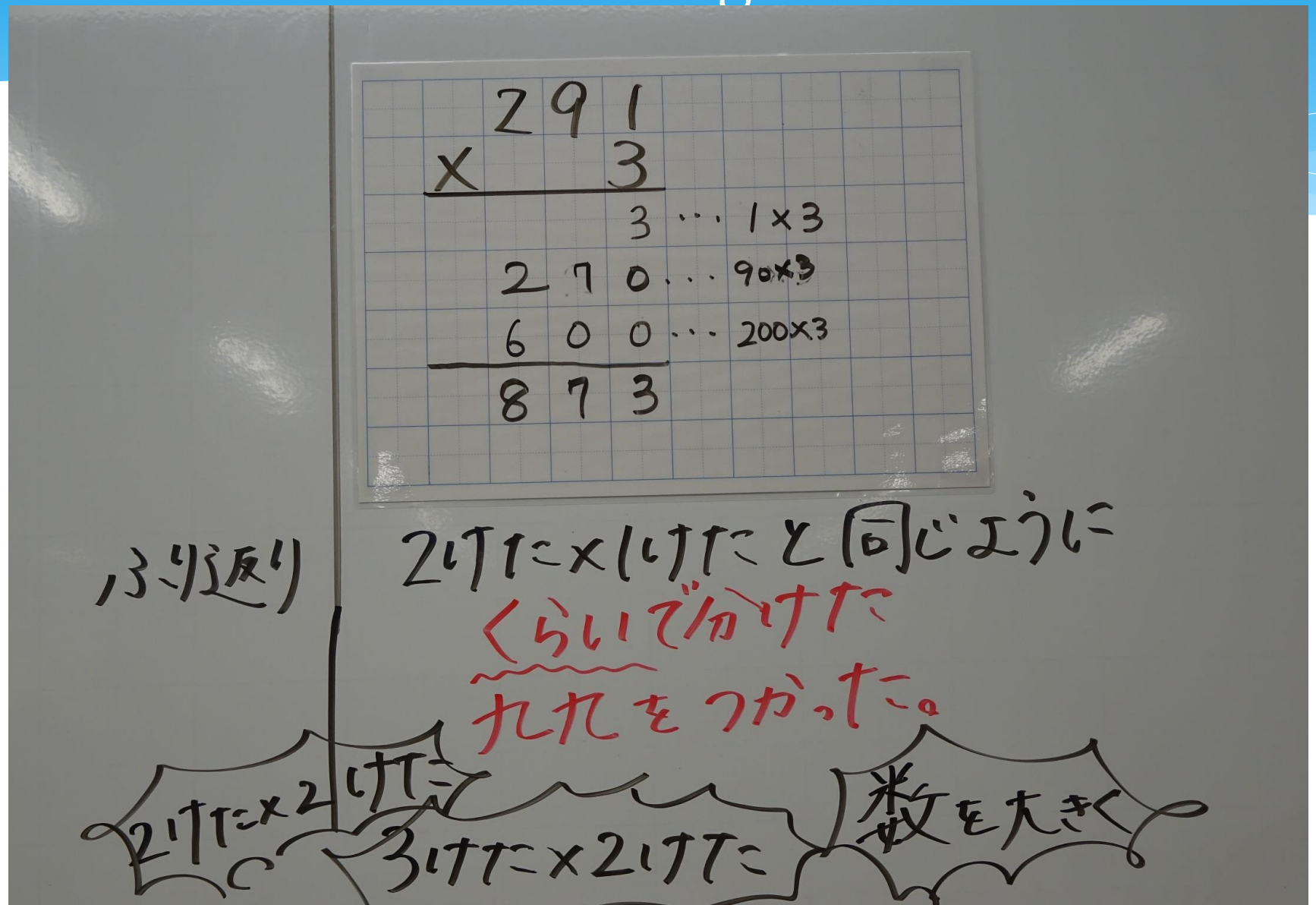
Classmate commented on her work and attitude

* “I was impressed by her attitude.
* She did a great job”

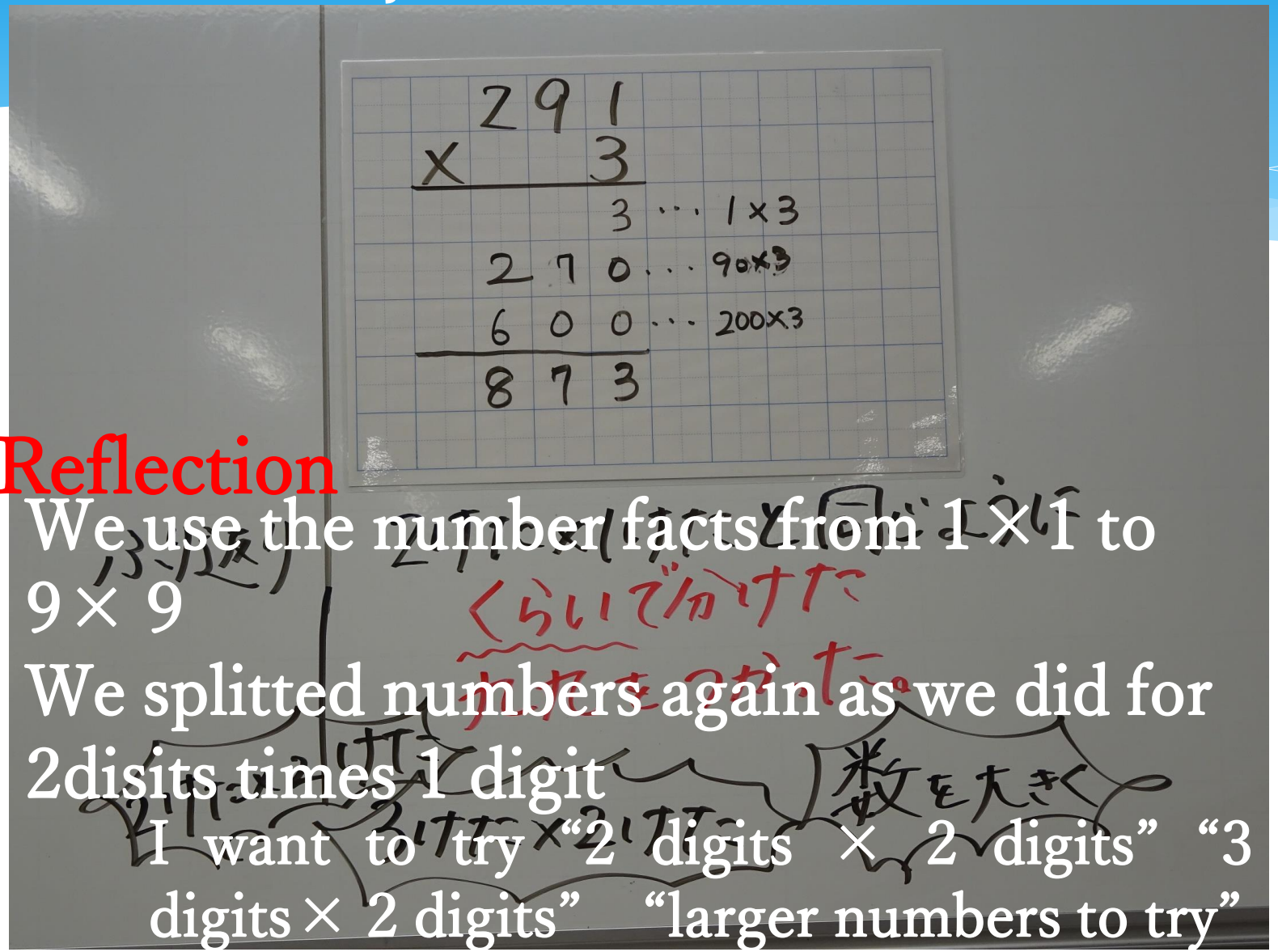
Classmate commented on her work and attitude

* “I did same mistake, too.
* She showed us how to correct it.”

Unfortunately, the final summary did not mention about values of algorithms



The final summary did not mention about values of algorithms



Reflection

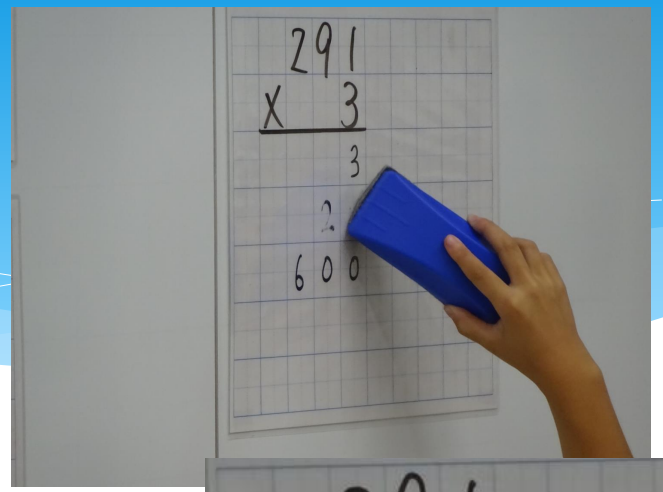
We use the number facts from 1×1 to 9×9

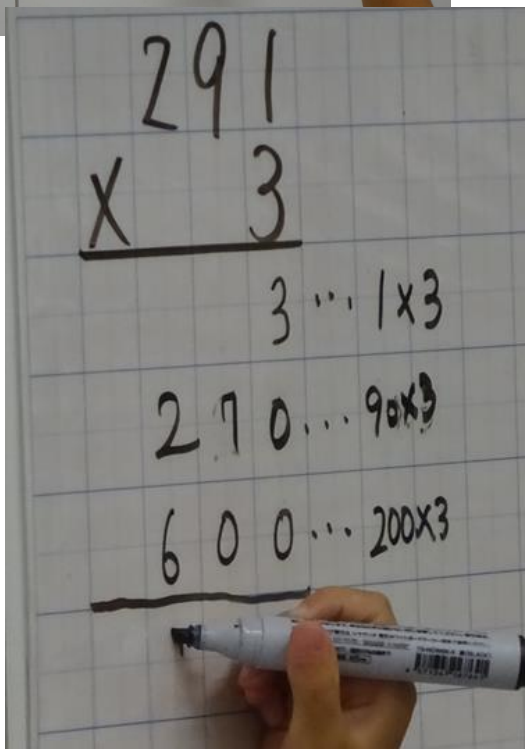
We splitted numbers again as we did for 2disits times 1 digit

I want to try “2 digits × 2 digits” “3 digits × 2 digits” “larger numbers to try”

So I talked about the value of algorithms as a final commentator

The Big Idea





* Values of algorithms:
* We can see the process
* We can identify which part is inappropriate or incorrect, so that we can correct them by ourselves
* Algorithms work for
* Self-diagnosis
* Self-treatment

Value of algorithms

* This lesson (or next lesson) is an appropriate place for teacher to introduce the longer version of vertical multilocation.
* Introducing the longer version of vertical multilocation, Neriage should be richer.
* **Through teaching of algorithms,**

We could teach students how to become a person who can do Self-diagnosis and Self-treatment

Finally,
Why we do Structured problem-solving lesson ?

* Because we want to teach mathematics through problem solving.
* So why “problem solving”?
* Because we want to educate students to become independent problem solvers or independent thinkers.

Thank you for Felicity sensei + planning team. And for your students:

You are genuinely independent thinkers!

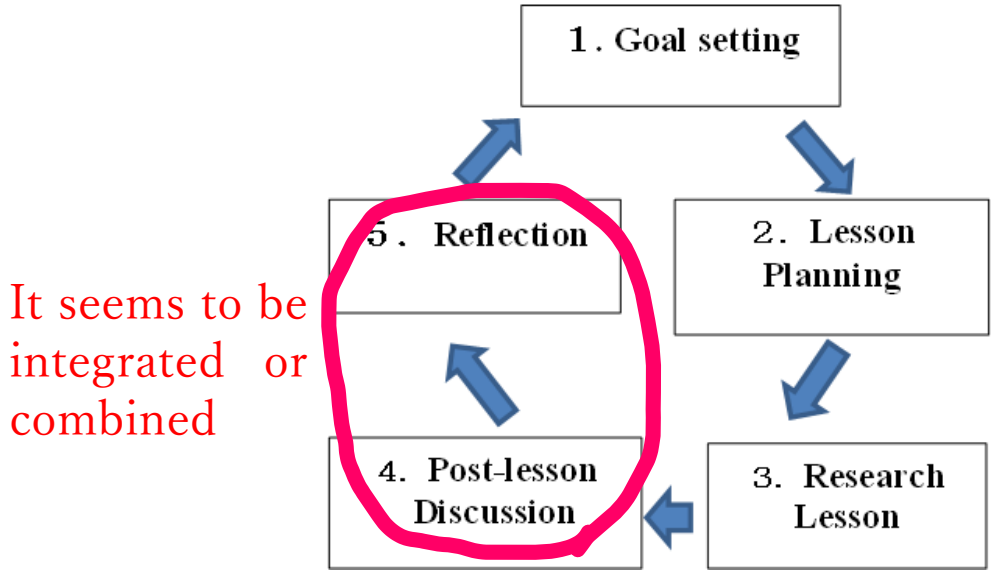
To prepare my comments, I dug up deeply the video-taken research lesson and post-lesson discussion, lesson plan, student notes and Australian curriculum. Through this experience, I become aware of that:

Webinar Lesson Study has new features, or a new future!

We have never experienced it before.

Ordinary Lesson Study

Webinar Lesson Study



It seems to be integrated or combined