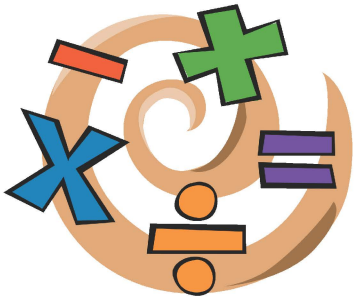
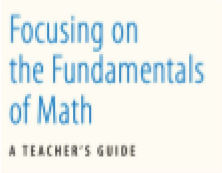
UGDSB Home Tip Sheet: Strategies to Add, Subtract, Multiply, and Divide



Why are we teaching strategies versus going straight to memorization?

- "Strategies help students find an answer even if they forget what was memorized. Discussing math fact strategies focuses attention on number sense, operations, patterns, properties, and other critical number concepts."
- "Children should learn their number facts. However, they would benefit from learning these facts by using an increasingly sophisticated series of strategies rather than by jumping directly to memorization."



These are quotes from the newly released Ministry of education document pictured above

Are teachers still teaching the way parents learned?

- Yes
- Our curriculum calls this the "standard algorithm"
- Teachers have the knowledge to know WHEN to teach the standard algorithm
- Example: students would begin to learn the standard algorithm for addition WHEN they have a solid understanding of place value (ie. they can easily break a 2 digit number into tens and one)

Homework

"I want to help my child with their math homework, but I don't understand how to help them. They say the need to use a specific strategy but I have no idea what that strategy is."

- Use the guide below to help
- Show your child the sheet to help you identify what strategy they are working on
- Give it your best shot
- If you and your child are still struggling feel free to stop. Communicate to the teacher in the child's agenda or a note that your child tried to do the homework but was unable to use the strategy requested.

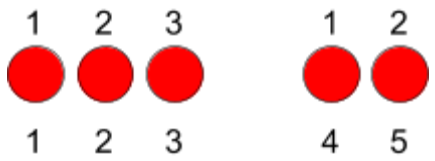
ADDITION

Counting All

Strategy Explained:

3 + 2

When counting all, the child counts to find the quantity of the first number (one, two, three on one hand), counts to find the quantity of the second number (one, two on the other hand), and then counts both hands to find the total.



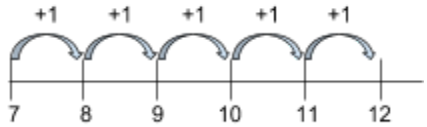
Counting On

Strategy Explained:

7 + 5

When counting on, the child starts with one of the numbers and counts on from this point. Children should be encouraged to count on from the larger number as they get more comfortable with this strategy.

Example
“7...8, 9, 10, 11, 12”



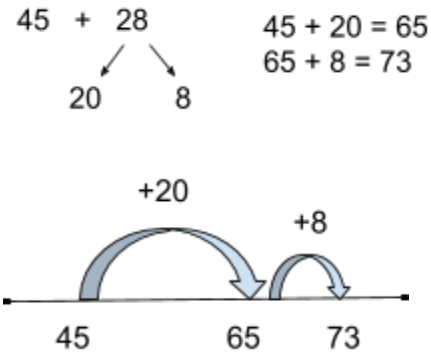
Adding Up in Chunks

Strategy Explained:

45 + 28

When adding up in chunks, a child will keep one addend whole and add the second number in easy-to-use chunks

Example:



Doubles/Near Doubles

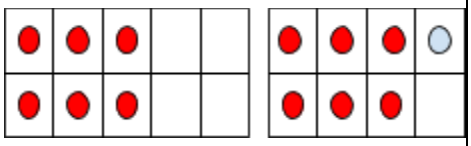
Strategy Explained:

6 + 7

When using doubles or near doubles, the child uses the recall of their doubles facts to help them efficiently add.

Example
“I know 6 plus 6 is 12, so 6 + 7 is one more than that...13”

6 + 6 = 12 SO 6 + 6 + 1 = 13



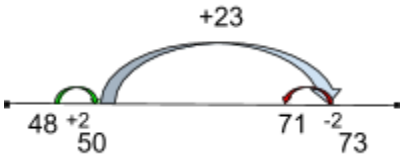
Friendly Numbers

Strategy Explained:

Students add to or subtract from one of the addends to make an easy number to add.

Example:

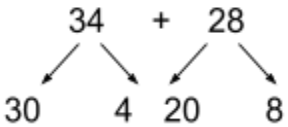
23 + 48
48 + 2 = 50 (round)
23 + 50 = 73
73 - 2 = 71 (fix)



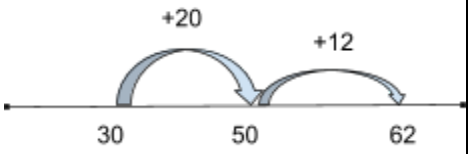
Place Value/Partial Sums

Strategy Explained:

When using place value, the child breaks each number (decomposes) into multiple numbers based on their place value, and then like values are combined.



30 + 20 = 50
4 + 8 = 12
50 + 12 = 62



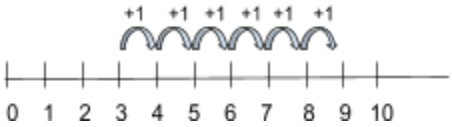
SUBTRACTION

Adding Up/Counting Back OR Removal

Adding Up Strategy Explained:

9 - 3

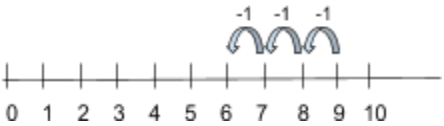
Students start at 3 and add up until they arrive at 9



Counting Back Strategy Explained:

9 - 3

Students start at 9 and count backwards 3



Adding Up in Chunks/Removal in Chunks

Removal in Chunks Strategy Explained:

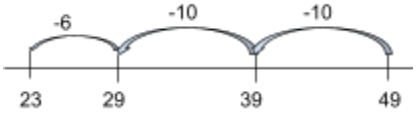
This strategy is essentially 'take-away' but using more efficient counting strategies to do so.

49 - 23

49 - (10 +10 +3) = 26

OR

49 - 23
49 - 20 = 29
29 - 3 = 26

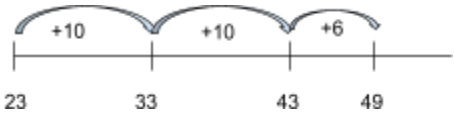


Adding Up in Chunks Strategy Explained:

This strategy is based on students understanding that subtraction can be the difference or space between two numbers.

49 - 23

23 + 10 = 33
33 + 10 = 43
43 + 6 = 49
10 + 10 + 6 = 26



Friendly Numbers

Strategy Explained:

Students add to or subtract from the subtrahend to make an easy number to subtract.

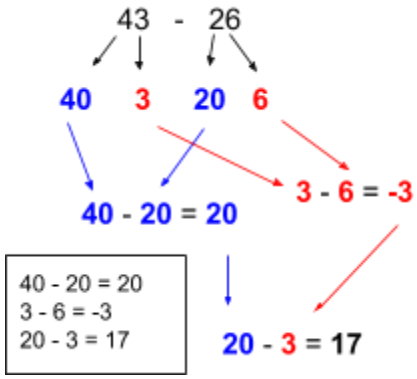
Example #1

49 - 23
23 - 3 = 20 (round)
49 - 20 = 29
29 - 3 = 26 (fix)

Place Value and Negative Numbers

Strategy Explained:

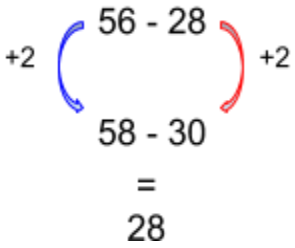
Each number is broken apart into its respective place value then subtracted based on place value.

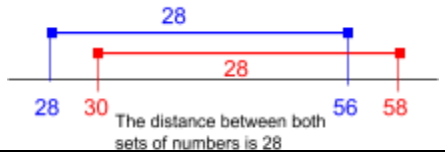


Keeping a Constant Difference

Strategy Explained:

Adding or subtracting the same quantity from both the subtrahend and minuend maintains the difference between the numbers.





MULTIPLICATION

Skip Counting/ Repeated Addition

Strategy Explained:

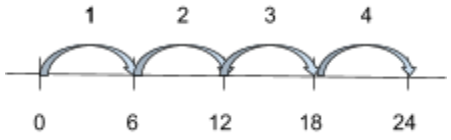
Students count (or add up) by a number to find the product

4 x 6 as 4 groups of six

4, 8, 12, 16, 20, 24

4 + 4 + 4 + 4 + 4 + 4 = 24

4 x 6



Doubling

Strategy Explained:

Students use their knowledge of skip counting and doubles or x2 facts to determine the product in more complicated situations.

4 x 3

2 x 3 = 6
2 x 3 = 6

Friendly Numbers

Strategy Explained:

Students use facts they know to help them solve facts they do not know.

9 x 8

10 x 8 = 80 * we added one more group of 8
80 - 8 = 72 * we took that extra group of 8 away
9 x 8 = 72

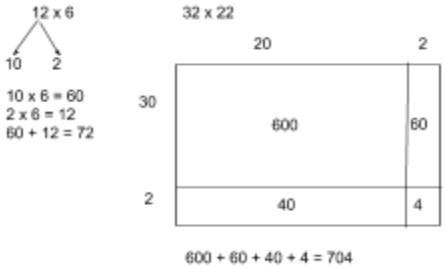
7 x 6

7 x 5 = 35 * start with a related fact we know
35 + 7 = 42 * adding one more group of 7
7 x 6 = 42

Partial Products

Strategy Explained:

Students look at the numbers being multiplied and split one (or both) numbers into numbers the are comfortable with.

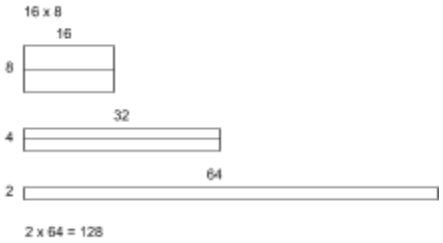


Doubling and Halving

Strategy Explained:

Students understand that if they double one number and halve the other number they will have an equivalent expression.

12 x 4
12 x 4 = 24 x 2
24 x 2 = 48 x 1



Breaking Factors into Smaller Factors

Strategy Explained:

Students understand that the can

12 x 6

12 x 6 = 2 x 6 x 6
12 x 6 = 2 x 36
12 x 6 = 72

12 x 13

12 x 13 = 3 x 4 x 13
12 x 13 = 3 x 52
12 x 13 = 156

divide a number into its factors if this makes the problem easier for them to solve.

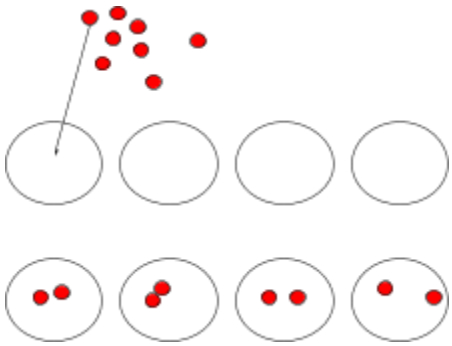
DIVISION

Fair Sharing/ Sharing Out

Strategy Explained:

Students share out into the corresponding number of groups until there are no more to share.

8 ÷ 4



Repeated Subtraction/ Repeated Addition

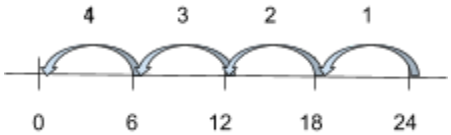
Strategy Explained:

Students count backwards or repeatedly subtract to find the answer.

12 ÷ 4

12 - 4 = 8
8 - 4 = 4
4 - 4 = 0
12 ÷ 4 = 3

24 ÷ 6



Partial Quotients

Strategy Explained:

Students use facts they know to take chunks away until they arrive at the answer.

42 ÷ 3

30 ÷ 3 = 10 * 3 will fit into 42 at least 10 times, but still 12 left
12 ÷ 3 = 4 * 3 fits into the remaining 12 4 times
42 ÷ 3 = 14

Multiplying Instead

Strategy Explained:

Students use their understanding of multiplication to help them solve division questions. This works because multiplication and division are inverse operations.

64 ÷ 8

8 x ? = 64
8 x 8 = 64
64 ÷ 8 = 8

Halving and Halving

Strategy Explained:

Students understand that if the divide each number in a division question by the same number it will create an equivalent question. They can use this understanding to make the question easier.

96 ÷ 8

96 ÷ 8 = 48 ÷ 4
* dividing each number by 2
48 ÷ 4 = 24 ÷ 2
* dividing each number by 2
24 ÷ 2 = 12 ÷ 1
* dividing each number by 2
96 ÷ 8 = 12

Students do not have to divide each number by 2. If they can see that a bigger number is a factor of both numbers they can divide with that number. In the above example, they student could have started to divide both numbers by 4.