Addition & Subtraction Strategies

What if my child is struggling with addition and subtraction sums?

- It is essential your child has a good understanding of basic addition and subtraction facts and place value:
  - Subitizing (seeing how many without counting)
  - Combinations of 5, 10, 20, 100
  - Doubles and halves to 20
  - Friendly number facts (20+5, 30+6)
  - Near Doubles facts
  - Place Value (how many 1s,10s, 100s? etc.)
  - Skip Counting by 2s, 3s, 5s, 10s etc.
- Try to discourage finger counting where possible. Although accurate, it is a very slow strategy and children can become over reliant on it.
- Regularly discuss strategies used to solve sums as this will inspire confidence.
- Gradually increase the complexity of sums.
- Do not resort to traditional algorithms. Speak regularly with your child's teacher for further assistance.

Flexible Thinking Activities

It is helpful for your child to practise their flexible thinking skills. For example:

Number Combinations

- Thinking about numbers in parts (partitioning).

  100 = 80 + 20
  55 + 45
  27 + 73

Rounding Numbers

- Rounding number and then adding of taking the leftovers.

  37 = 30 + 7
  40-3

50 and Some More

- Say a number between 50 and 100 (eg 76). Students respond with '50 and __(16)__ make 76. For larger numbers, have students use the largest increment of 50

  Parent: My number is 482.
  Student: 450 and __(32)__ make 482.

The Other Part of...

- Give your child a 2-digit number and have them mentally solve how to make 50, 100, 500 or 1000.

  Have them check their answers on paper if necessary. Discuss the strategies he or she used.

  Parent: My number is 386
  Student: 386 and __(14)__ make 500.

Compatible Pairs

Make 50

37 41 28 9 31
12 38 13 19 22

Using 5s to Make 100

25 45 5 85 65
35 95 15 55 75

Make 500

240 415 350 125 165
85 335 150 375 260

Make 1000

815 565 240 720 635 760
365 450 435 550 280 185

Calculator Challenge Counting

- Have your child enter a number on their calculator (large or small depending on their ability). Ask them to add or subtract a new number. Before pressing =, ask them to predict the answer. Verify the answer and discuss the strategy they used.

Lee Pereira and Erin Smith 2014

Millars Well PS

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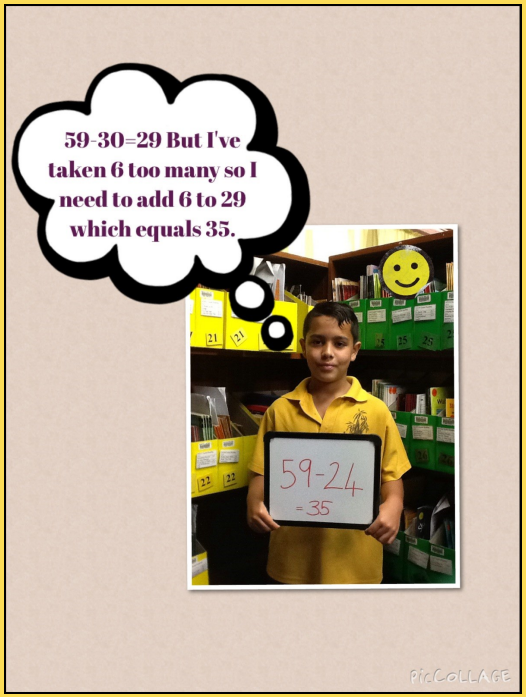
Helping My Child At Home



Why is my child not stacking their addition and subtraction sums?

With today's smart phones and other digital technologies, there is no longer a great need to solve large sums using traditional pen and paper methods. There are also many alternative strategies in which students can solve sums mentally without digital devices.

Usually, mental calculation strategies are easier, faster and can often be used without the need for working out.

Although traditional algorithms work, they can take time to solve and students often make errors as they do not have a deep understanding of the mathematics behind them.

Invented Strategies vs Traditional Algorithms

- Invented strategies are based on place value understandings rather than looking at digits in isolation. Looking at an entire number enables students to identify the easiest and most efficient strategy to use.

  For example, ***45 + 27***
  An efficient mental calculation might be:
  40 + 20 = 60;
  5 + 7 = 12;
  60 + 12 = 72.

  A traditional algorithm would encourage students to add single digits (Eg. 4 + 2) rather than (40 + 20), which is based on their understanding of place value.

- Traditional addition and subtraction algorithms work from right to left and hide the answer until the sum has been solved. Again, students see numbers as digits only and are less likely to identify miscalculations.

  For example, ***36 + 41***
  Using invented strategies, this might begin with **30 + 40 = 70**. This provides students a sense of the size of the eventual answer.

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- Invented strategies are built on student understanding, rather than 'rules' or 'steps' to remember. Students can develop repeated errors with traditional methods if they forget the steps or misunderstand the 'rules'. Studies suggest students make fewer errors with invented strategies.

PLEASE REMEMBER

Students should not be expected to calculate without written support when first learning to use mental strategies. Even when students have become efficient in using particular strategies, they may still require the use of partially written support structures to aid their memory.

Students should not use mental strategies without understanding the mathematics behind them.

How to help your child with addition and subtraction

- Provide your child with a range of two and three digit numbers to add and subtract.
- Suggest your child record their strategies on paper. This allows students to continuously clarify their methods. It also creates a reference when discussing your child's chosen methods and their justifications for using it.
- Challenge your child to find a second method or improve on his or her written explanation.
- When providing your child with sums to solve, write them horizontally rather than vertically. This encourages students to think in terms of numbers rather than digits and is less likely to encourage the use of a traditional algorithm.

Examples of addition and subtraction strategies

ADDITION

Add Tens, Add Ones, Then Combine
46 + 38
40 + 30 = 70
6 + 8 = 14
70 + 14 = 84

Add On Tens, Then Add Ones
46 + 38
46 + 30 = 76
76 + 8 = 84

Addition & Subtraction Strategies

Move Some to Make Tens
46 + 38
44 + 40 = 84

Use a Nice Number and Compensate
46 + 38
46 + 40 = 86
86 - 2 = 84

SUBTRACTION

Add Tens to Get Close, Then Ones
73 - 46
"I'll try adding 20. Adding 30 will be too much"
46 + 20 = 66
"I need 4 more to get to 70"
66 + 4 = 70
"Now I only need 3 more to get to 73"
70 + 3 = 73.

Add Tens to Overshoot, Then Come Back
73 - 46
"46 and 30 are 76. That's 3 too much, so it's 27.

46 + 30 = 76
76 - 3 = 73

Take Tens From the Then Subtract One
73 - 46
70 - 40 = 30
30 - 6 = 24
"Add the 3 (from the 73) that I didn't use at the beginning"
24 + 3 = 27

Similarly:
"I'll make 46 an easier number"
46 4 50
"I now need 23 to get to Tens, 73. Then I need to add the 4 I didn't use at the beginning"
50 + 23 = 73
23 + 4 = 27

Take Away Tens, Then Ones
73 - 46
73 - 40 = 33
33 - 6 = 27

Take Extra Tens, Then Add Back
73 - 46
73 - 50 = 23
23 + 4 = 27

Add to the Whole If Necessary
73 - 46
"Give 3 to 73 to make 76. 76 - 46 = 30. Now take back the 3 given to 73 at the beginning"

73 - 46 = 30
30 - 3 = 27

Information taken from: "Van de Walle & Lovin, Student Centred Mathematics Years 5-8, 2006"