• Exemplar •

Keywords in Math Word Problems

(Look for these key words in word problems to tell you which operation to do)

Add

Sum
Total
Increase/increased by
Together
Altogether
Both
In all
More than
Added to
Gain
Combined
Additional
Plus
Extra
Combined

Subtract

Difference
How much more
How many are left
How many more
Decrease
Remainder
Left
Less/loss
Remain
More than
Fewer than
Less than
Minus
Reduce
Take away
Words ending in –er: fewer, shorter, etc.

Multiply

Product
Of
Times
By
As much
Multiplied
Twice
Triple
Fraction of
Percent of
Every
At this rate

Divide

Quotient
Shared/Shared equally
Divide/ Divide equally
Each
Per
Split/cut
How many times
Average
Pieces
Ratio
Part of
Evenly

Created by Mrs. Stephanie White

TABLE 1. Common addition and subtraction situations.[6]

	Result Unknown	Change Unknown	Start Unknown
Add to	Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now? 2 + 3 = ?	Two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were five bunnies. How many bunnies hopped over to the first two? 2 + ? = 5	Some bunnies were sitting on the grass. Three more bunnies hopped there. Then there were five bunnies. How many bunnies were on the grass before? ? + 3 = 5
Take from	Five apples were on the table. I ate two apples. How many apples are on the table now? 5 - 2 = ?	Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat? 5 - ? = 3	Some apples were on the table. I ate two apples. Then there were three apples. How many apples were on the table before? ? - 2 = 3

	Total Unknown	Addend Unknown	Both Addends Unknown[1]
Put Together/ Take Apart[2]	Three red apples and two green apples are on the table. How many apples are on the table? 3 + 2 = ?	Five apples are on the table. Three are red and the rest are green. How many apples are green? 3 + ? = 5, 5 - 3 = ?	Grandma has five flowers. How many can she put in her red vase and how many in her blue vase? 5 = 0 + 5, 5 = 5 + 0 5 = 1 + 4, 5 = 4 + 1 5 = 2 + 3, 5 = 3 + 2

	Difference Unknown	Bigger Unknown	Smaller Unknown
Compare[3]	("How many more?" version): Lucy has two apples. Julie has five apples. How many more apples does Julie have than Lucy? ("How many fewer?" version): Lucy has two apples. Julie has five apples. How many fewer apples does Lucy have than Julie? 2 + ? = 5, 5 - 2 = ?	(Version with "more"): Julie has three more apples than Lucy. Lucy has two apples. How many apples does Julie have? (Version with "fewer"): Lucy has 3 fewer apples than Julie. Lucy has two apples. How many apples does Julie have? 2 + 3 = ?, 3 + 2 = ?	(Version with "more"): Julie has three more apples than Lucy. Julie has five apples. How many apples does Lucy have? (Version with "fewer"): Lucy has 3 fewer apples than Julie. Julie has five apples. How many apples does Lucy have? 5 - 3 = ?, ? + 3 = 5

[1]These take apart situations can be used to show all the decompositions of a given number. The associated equations, which have the total on the left of the equal sign, help children understand that the = sign does not always mean makes or results in but always does mean is the same number as.
[2]Either addend can be unknown, so there are three variations of these problem situations. Both Addends Unknown is a productive extension of this basic situation, especially for small numbers less than or equal to 10.
[3]For the Bigger Unknown or Smaller Unknown situations, one version directs the correct operation (the version using more for the bigger unknown and using less for the smaller unknown). The other versions are more difficult.

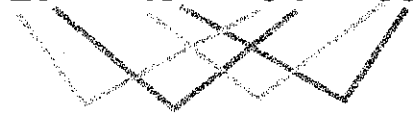
[6]Adapted from Box 2-4 of Mathematics Learning in Early Childhood, National Research Council (2009, pp. 32, 33).

Addition and Subtraction Strategies

Level B

Branching Strategy for Addition

26 + 43 + 54 + 66 = 189



70 + 10 + 100 + 9

Partial Sums Strategy for Addition

$$\begin{array}{r} 378 \\ +\ 257 \\ \hline 300 + 200 = 500 \\ 70 + 50 = 120 \\ 8 + 7 = 15 \\ \hline 635 \end{array}$$

Decomposing Strategy for Addition

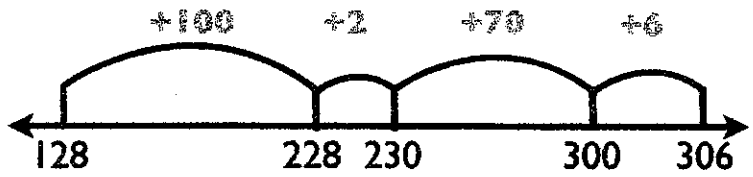
$$\begin{array}{l} 378 = 300 + 70 + 8 \\ 257 = 200 + 50 + 7 \\ \hline 500 + 120 + 15 = 635 \end{array}$$

Open Number Line Strategy for Subtraction

306 - 128 = _____

or

128 + _____ = 306



100 + 70 + 6 + 2 = 178

Potential hazards to teaching the "stacking" algorithms too early.....

- When students solve problems this way they do not correspond with the way we think about numbers.

  (i.e. the "4" in the number 547 is treated as a "4" and not a "40"

- When students solve problems this way children are encouraged to give up their own thinking. They are encouraged to instead get quick and reliable answers.
- When students solve problems this way children have a blind acceptance of results and over-zealous applications often when it is not necessary.

($100.00 - $ 99.95 = ? students may start to do the algorithm rather than being aware of how close those values really are.)

Addition and subtraction strategies

- Count all (students will count all to find the total of the two collections)
- Count- on (Students will count on from one number to find the total of collections)
- Count-back /count down to/ count up from (given a subtraction situation students will choose appropriate strategies)
- Basic strategies (students will use doubles, commutative property, adding tens, ten facts other known facts)
- Derived strategies (near double, adding 9, build to the next ten, fact families, other strategies)

Rule of thumb: students **should not** be taught conventional written algorithms until they are able to add and subtract two- digit numbers in their heads. Most students are not ready for this until the end of 4th grade)