

# About the Mathematics: Multi-Digit Addition & Subtraction

Speaking in values when working with numbers

## Combining Like Units/Partial Sums/Tens & Ones Strategy

### Addition

Horizontal format:

$$54 + 38 \quad 50 + 30 = 80$$

$$4 + 8 = 12$$

$$80 + 12 = 92$$

Vertical format:

$$\begin{array}{r} 54 \\ + 38 \\ \hline 80 \\ + 12 \\ \hline 92 \end{array} \quad \text{Starting with the tens}$$

$$\begin{array}{r} 54 \\ + 38 \\ \hline 12 \\ + 80 \\ \hline 92 \\ 1 \\ 54 \\ + 38 \\ \hline 92 \end{array} \quad \text{Starting with the ones}$$

The Standard Algorithm and Partial Sums starting in the ones place are identical strategies, just formatted differently. The standard algorithm is a space saving device. The question is, is the student using the language of value to solve the task or using digitized language?

## Combining Like Units/Partial Differences Strategy

### Subtraction

Horizontal format:

$$54 - 38 \quad 50 - 30 = 20 \quad 4 - 8 = -4 \quad 20 - 4 = 16$$

Vertical format:

$$\begin{array}{r} 54 \\ - 38 \\ \hline 20 \\ - 4 \\ \hline 16 \end{array}$$

When students say, "you can't take 8 from 4," my response is, "Who says?" This leads to two possible conversations depending upon the knowledge of the student. 1) "You'll get a negative number!" Thus  $4 - 8$  can be expressed by students in two ways. "Four minus eight is negative four." Or 2) Student: "I don't have enough." To which I reply, "What are you short?" "Four!" In which case I direct the student to write  $-4$  underneath the 20.