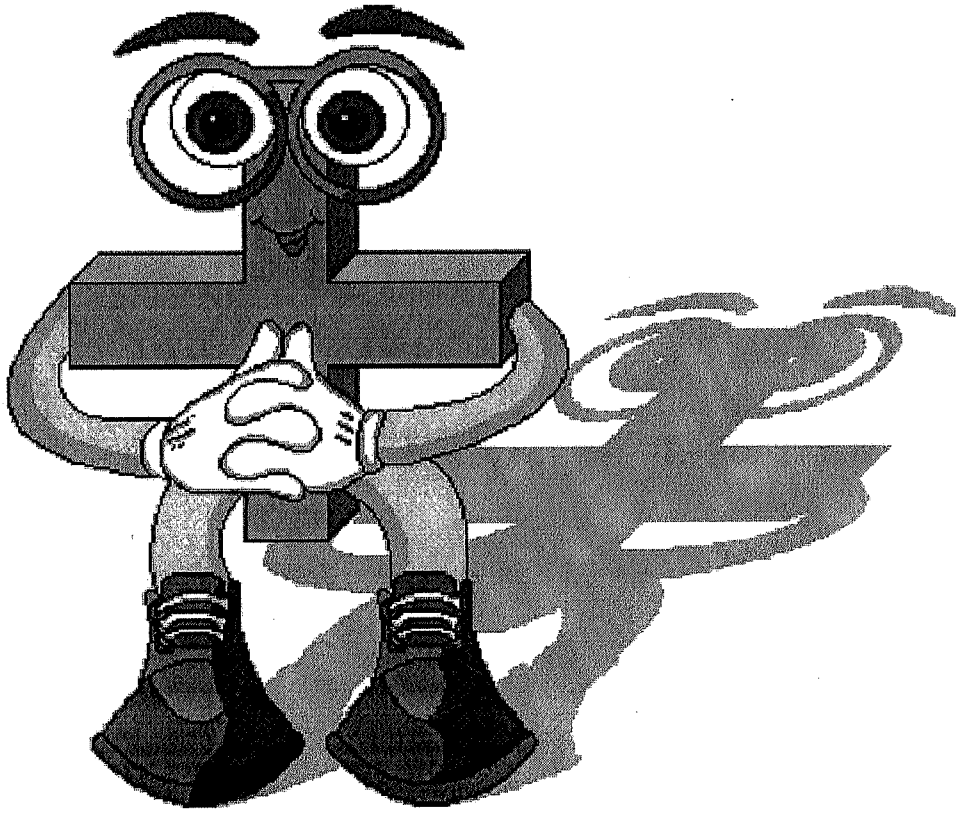
Addition Strategies and Algorithms



Counting On

What is it?

Students will start with an addend and count on to find the sum.

When do I use it?

Students use this strategy to find sums of beginning addition problems.

Example:

For example, if a student is adding 7 and 3, the teacher would have him: "Grab" 7 (in the air) and say "7." Then, (s)he would count on "8, 9, 10." Students will hold out their fingers as they are counting to represent the 8, 9, and 10.

Milestones:

If students consistently begin with the larger number and view that number as a whole group rather than single items, they are ready to move forward to Making 10 and Shifting. (You will know they are viewing the number as single items if you see them returning to one to begin counting.)

Making 10s, 100, and 100s

What is it?

Students are given a number and can state the number needed to make a number such as 20, 30, 70, 100, 400, etc.

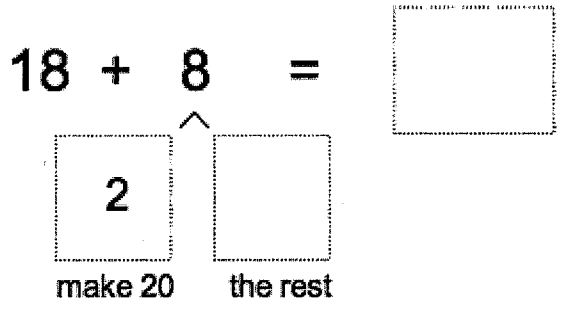
When do I use it?

Students use this strategy when finding complements of multiples of 10.

Example:

For example, if the target is 20 and the teacher says 15, the students would respond with "5" because 15 + 5 = 20
For making 100, students would say 37 if their teacher said 63. 100 is another landmark number students need to learn flexibility with as well.

Example: **18 + 8 = ?**



Milestones:

Look for students to consistently and quickly give the complements of 10 and 10s and develop flexibility with 100 and 100s.
Students may be using this strategy concurrently with partial sums.

Using a Number Grid

What is it?

A number grid lends itself to many activities that reinforce understanding of numeration and place value. For example, by exploring the patterns in rows and columns, children discover that any number on the number grid is:

When do I use it?

Use the number grid for finding sums of beginning addition problems and two-digit addition problems.

- 1 more than the number to its left
- 1 less than the number to its right
- 10 more than the number above it
- 10 less than the number below it

Example:

17 + 25 = ?

- Start at 17.
- Add 20.
- Move down 2 rows to 37.
- Add 5.
- Count 5 more to 42.

17 + 25 = 42

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Milestones:

When students begin adding 10s and 1s in their head (they no longer rely on the number grid) they are ready to move on to Partial Sums.

Partial-Partial Sums

What is it?

This algorithm is an extension of the Partial Sums Algorithm. However, students are now breaking apart only one of the addends.

When do I use it?

Students will use this strategy when adding two or more two- or three-digit numbers.

Example:

- 17 + 25 = ?
  - Add the 20 to 17. 17 + 20 = 37
  - Add the 5 ones to the previous partial sum 37 + 5 = 42

So, 17 + 25 = 42

As children grow in their flexibility with numbers, you may begin to see them using the "Make 10" Strategy with Partial Sums.

- 37 + 8 = ?

  3 + 5
  - 37 + 3 = 40
  - 40 + 5 = 45

Milestones:

Some students will be doing this concurrently with column addition. (The Partial-Partial Sums algorithm is more of a mental math strategy.)

Transitioning

What might the transition from Partial Sums to Place Value (or Traditional) look like?

The entire Partials Algorithm is built on the premise of children thinking of numbers in pieces. We begin with children looking at problems horizontally so that they are more concerned with decomposing the number into its pieces than a procedure for solving the problem.

Once children understand the process behind adding numbers in parts, it is time to transition them from horizontal problems to vertical problems.

Beginning Understanding	**Intermediate Understanding**	**Advanced Understanding**
27 + 15 = ?	27	$\overset{1}{2}7$
	+15	+15
20 + 10 = 30	30	42
7 + 5 = 12	+12	
30 + 12 = 42	42	

Beginning preliminary discussions about what the 1 in 12 means will lend itself to the transition to the traditional algorithm.