



January Curriculum Planning Grade 1



“Students proficient with mental mathematics build confidence in doing mathematics, become more flexible thinkers, and are more able to use multiple approaches to solving problems.” WNCP

Types of Addition and Subtraction Word Problems

Students need experience with all the common types of addition and subtraction problems. Researchers have separated addition and subtraction problems into categories based on the kinds of relationships involved. These include **compare** problems, **join** problems, **separate** problems, and **part-part-whole** problems. Students must decode and interpret number stories and not just rely on looking for “clue words” to decide what operation to perform. Generally, but not always, students find joining and separating (take-away) situations easiest to deal with. Students are encouraged to model number stories as they are presented, however, even young children can deal with part-part-whole and comparison situations. See the next page for examples of word problems.

Curriculum Outcomes for January

N1 (cont'd): Say the number sequence, 0 to 100, by:

- 1s forward and backward between any two given numbers
- 2s to 20, forward starting at 0
- 5s and 10s to 100, forward starting at 0. [C, CN, V, ME]

N6: Estimate quantities to 20 by using referents. Focus on estimation to 10.

[C, ME, PS, R, V]

N9: Demonstrate an understanding of addition of numbers with answers to 20 and their corresponding subtraction facts, concretely, pictorially and symbolically by:

- using familiar and mathematical language to describe additive and subtractive actions from their experience
- creating and solving problems in context that involve addition and subtraction
- modeling addition and subtraction using a variety of concrete and visual representations, and recording the process symbolically [C, CN, ME, PS, R, V]

PR3: Describe equality as a balance and inequality as an imbalance, concretely and pictorially (0-20). [C, CN, R, V]

PR4: Record equalities using the equal symbol. [C, CN, PS, V]

Revisit N4 (represent numbers) and N7 (demonstrate numbers) through warm-ups, journaling, and other daily activities.

Mathematical Processes

Communication (C): Talking and discussing are important aspects in refining a student's personal strategy to solving problems. As students talk about their thinking, they are able to organize their thoughts, but also hear how others are making sense of the task. This sharing of ideas helps to solidify understanding for some students, and for others, helps them to think about the problem in a new way. Questions to facilitate discussion: “Tell me what you were thinking when you did that.”, “Why or how does that work?”, “What would happen if...?”, “How does that make sense to you?”

Connections (CN): When students make that important connection between all that they know about counting by ones and the concept of grouping by tens, they should notice how much easier it is to count.

Reasoning (R): Students should be encouraged to recognize that estimation is not simply guessing but *informed reasoning*. They should come to appreciate it as a way of obtaining appropriate answers to many real-world problems in a timely manner and as an efficient way to check the accuracy of problem solutions involving computations.

Mental Mathematics and Estimation (ME): If children are encouraged to use estimation and are helped to develop specific strategies to assist them in doing so, they will come to accept estimation as an appropriate part of mathematics and to appreciate it as a forceful mathematical idea that can be used in solving problems and in checking the reasonableness of results. It is important for a child to learn that mathematics involves more than exactness.

Problem Solving (PS): Appropriate problem solving strategies at this age include: acting it out, using a model, drawing a picture, guessing and testing, as well as looking for a pattern.

Technology (T): Interactive hundred boards are available through both SMART software and internet-based sites, such as “Splat Squares” or “Dog Bone” on <http://resources.oswego.org/games/>



Visualization (V): Allowing students to model number sentences such as $5 + 2 = 7$ using manipulatives, for example, ten frames, snap cubes, balance scales, etc., gives them a visual to see whether or not the two sides of the number sentence are equal.

Types of Addition and Subtraction Word Problems

Compare Problems

Compare: Difference Unknown

"George has 12 pennies and Sue has 8 pennies. How many more pennies does George have than Sue?"

Compare: Larger Unknown "George has 4 more pennies than Sue. Sue has 8 pennies. How many pennies does George have?"

Compare: Smaller Unknown

"George has 4 more pennies than Sue. George has 12 pennies. How many pennies does Sue have?"



Join Problems

Join: Result Unknown "Sue had 8 pennies.

George gave her 4 more. How many pennies does Sue have altogether?"

Join: Change Unknown "Sue had 8 pennies.

George gave her some more. Now Sue has 12 pennies. How many did George give her?"

Join: Start Unknown "Sue had some pennies. George gave her 4 more. Now Sue has 12 pennies. How many pennies did Sue have to begin with?"

Separate Problems

Separate: Result Unknown "Sue had 12

pennies. She gave 4 pennies to George. How many pennies does Sue have now?"

Separate: Change Unknown "Sue has 12 pennies. She gave some to George. Now she has 8 pennies. How many did she give to George?"

Separate: Start Unknown "Sue had some pennies. She gave 4 to George. Now Sue has 8 pennies left. How many pennies did Sue have to begin with?"

Part-Part- Whole Problems

Part-Part-Whole: Whole Unknown- "George has 4 pennies and 8 nickels. How many coins does he have?"

Part-Part-Whole: Part Unknown- "George has 12 coins. Eight of his coins are pennies, and the rest are nickels. How many nickels does George have?"

**See portal for supporting documents:
4 Ways to Subtract
and
Manipulatives for Subtraction**

Investigation Ideas

Writing Problem Books: Students work in pairs to write problem books for the class. Assign three fact family numbers to each group. Have students write and illustrate a set of problems that use the three numbers.

Possible criteria:

- 2 addition problems
- 2 subtraction problems
- all problems should ask a question
- a number sentence and the answer for each problem should be written on the back of the problem or under a flap

Have the problems shared with the class. Books can be placed at the math centre for others to read and solve. (N9)

True or False Game - Have students each create 5 game cards for a True or False game (see Game Ideas). Each card needs to have a number sentence, either true or false. The answer needs to be on the back of the card. Put a "T" for true or an "F" for false in the bottom right hand corner. (PR4)

Sample:

Front:	Back:
$6 + 2 = 4 + 4$	T

Journal Ideas

Choose a number between 6 and 20. Can you make two number sentences that balance on a teeter-totter? (PR4)

About how many ten frames would you need to represent the number ___? Explain your thinking. (N6)

How are the numbers 10 and 15 alike? How are they different? (N4)

Some students are sharing 20 stickers. If there are 3 students, how many stickers will each get? How many will be left over? What if 4 students were sharing? (N7)

Interesting Websites

<http://illuminations.nctm.org/ActivityDetail.aspx?ID=218> (N1, N7)

<http://www.oswego.org/ocsd-web/games/Estimate/estimate.html> (N6)

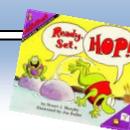
<http://illuminations.nctm.org/ActivityDetail.aspx?ID=198> (N9)

Literature Connections



Ready, Set, Hop by Stuart Murphy (N9)

A Bear Fair Share by Stuart Murphy (N7)



Game/Activity Ideas

Domino Addition and Subtraction: Students use dominoes to create addition and subtraction problems. They record their number sentence, solve the problem, and record the answer. (N9) See portal for game board.

True or False Game: Game cards are placed face down on the table (see Investigation Ideas for cards and portal for game board). Players take turns drawing a card, stating whether the equation is true or false. If correct, the players move their game marker two spaces for a true statement and one space for a false statement. (PR4)

Contexts for Learning Mathematics

Maarten Dolk and Catherine Twomey-Fosnot

The Double-Decker Bus

Unit begins with the story of a double-decker bus—a bus that has two decks with ten seats on each. In this unit, children move the beads on the rekenrek to represent passengers going from one deck on the bus to the other, and sitting in various combinations in the red and white seats. This helps students understand that numbers can be named in many ways, for example 10 as $6 + 4$, $7 + 3$, or $5 + 5$. (N1, N2, N3, N4, N6, N7, PR3, PR4)

