Math 4 - Act. 01: Mental Math: Addition and Subtraction

Summary

In this lesson students will use the mental math skill of adding and subtracting by making multiples of ten and adjusting (compensation). These suggested strategies should be discussed in two separate lessons.

Time Frame

2 class periods of 30 minutes each

Materials

- 7 books
- counters for each pair of students
- 2 stools/chairs exactly the same height

Additional Resources

Mental Math in the Middle Grades, Dale Seymour Publications, 1987.

Background for Teachers

Calculating in your head is a practical life skill. Many types of everyday computation problems can be solved mentally. Mental calculation provides the cornerstone for all estimation processes, allowing a variety of alternative nonstandard techniques or strategies for finding answers. Mental computation encourages students to think about numbers and number relationships developing strong number sense and mathematical confidence. A survey from the National Assessment of Educational Progress in mathematics found that most children were unaware that a mental calculation is often the most convenient method to find a solution. Most students claimed that either a paper and pencil or calculator was needed to determine solutions.

It would be helpful if students have had prior experience with compatible numbers, in this case, pairs of numbers that "make ten."

Intended Learning Outcomes

1. Demonstrate a positive learning attitude toward mathematics.
2. Become mathematical problem solvers.
3. Reason mathematically.
4. Communicate mathematically.
5. Make mathematical connections.
6. Represent mathematical situations.

Instructional Procedures

Lesson One:Trading Off (Compensation)

Invitation to Learn

Give one student 4 books and another student 3 books. Ask: "If you take part of the books from one student and give it to the other student does it change the total amount of books? How can this idea help you to add numbers?"

Instructional Procedures:

Students work in pairs. Have each student count out a certain number of counters and find the total. Determine how many counters would be needed to make one group a multiple of 10. Move this amount of counters from one group to the other group. Does this change the total amount? (No) Repeat this activity several times with different numbers of counters.

Give the students an addition problem and have them "make tens" by adding a compatible number to one of the addends. Go back and subtract the same amount from the other addend to compensate. Then add the two adjusted addends.

Practice trading off numbers in order to make a nice even group of tens for easier computation.

Problems for practice:

29 + 62	37 + 69
28 + 45	43 + 49
49 + 26	55 + 19

Lesson Two:Balancing Subtraction (Compensation)

Invitation to Learn

Have two students of different heights help to demonstrate the idea that if you add the same amount to both the number you are subtracting and the number you started with, the difference will be the same.

Ask who is taller and approximately what is the difference in height? Give the shorter student a small stool/chair to stand on. (This student should now be taller). Many of the students will pick up on the idea that the difference changed when the shorter student had something to stand on. In order to keep the difference the same, the taller student would need something the same size to stand on. How can you use this idea to help you subtract numbers?

Instructional Procedures

Students need to understand renaming subtraction. Write a simple subtraction problem on the board. Have the students count out the first number of counters and subtract the second number. (e.g., 6 - 2 = 4).

Use the same problem and add "1" to each of the numbers.

(e.g., 7 - 3 = 4). What happened to the difference when we renamed the problem by adding the same quantity to both numbers? (stayed the same). Try adding "2" to each of the original numbers. Three. Four. Does the difference stay the same?

Give students several problems to subtract using the balancing subtraction strategy. Make sure students understand that we want to "make tens" with the number we are subtracting (subtrahend), not the one we are subtracting from (minuend). It is much easier to subtract a nice even group of tens from another number B no borrowing, etc.

Problems for practice:

65 - 49	44 - 28
43 - 19	81 - 58
72 - 29	71 - 47

Extensions

Possible Extensions/Adaptations/Integration

Use these strategies to find the sum and difference of 3 and 4 digit numbers.

Homework & Family Connections

Have students teach a member of their family a new way to mentally add or subtract and return a note indicating the shared mathematical experience between the family member and the student.

Assessment Plan

Have students write instructions for how to perform the skill they have just learned in their journals.

Authors

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