

Addition-There's More than One Way

Main Core Tie

Mathematics Grade 1

[Strand: NUMBER AND OPERATIONS IN BASE TEN \(1.NBT\) Standard 1.NBT.4](#)

Additional Core Ties

Mathematics Grade 1

[Strand: NUMBER AND OPERATIONS IN BASE TEN \(1.NBT\) Standard 1.NBT.6](#)

Materials

Invitation to Learn

Addition/Subtraction Mats

Base Ten Blocks

- [Spin and Add](#)

Transparent spinners

Math journals

Two and Three Digit Addition Strategies

- [Addition Strategies Foldable](#)

Scissors

Partner Roll and Add

Math journals

Place Value cubes

Additional Resources

Books

Principles and Standards for School Mathematics, by National Council of Teachers of Mathematics; ISBN 9 780873534802

Developing Number Concepts; Place Value, Multiplication, and Division, by Kathy Richardson; ISBN 0-7690-0060-6 21882

Elementary and Middle School Mathematics; Teaching Developmentally, by John A. Van De Walle; ISBN 0-205-38689-X

Mall Mania, by Stuart Murphy; ISBN 978-0-06-055777-5

Mission Addition, by Loreen Leedy; ISBN 0-8234-1412-4

A Fair Bear Share, by Stuart Murphy; ISBN 0-06-446714-7

Background for Teachers

Flexible or invented methods of computation require a student to have a good understanding of place value, compatible numbers, and operations and properties of the operations. Invented methods require students to take apart and combine numbers in a variety of ways. Students have to use their number sense to solve problems, and look at numbers as a composite number rather than a single digit. Invented strategies rely on the students' understanding. Students who have an opportunity to work with invented strategies will have an easier time understanding the traditional algorithm. Research shows that students that are taught the standard algorithms too early use the algorithms as a substitute for thinking and common sense.

There are many different inventive strategies for addition, but in this lesson we will discuss three different ways that students often use to solve problems. The first strategy will be referred to as "Expanded Form." Students write the numbers in expanded form first and then add the different place values. The answers from each of the places are then added together.

Example:

$$\begin{array}{r} 36 \ 30 \\ + 57 \ 50 \\ \hline 80 \end{array} \quad \begin{array}{r} + 6 \\ + 7 \\ \hline 13 \end{array} \quad \begin{array}{r} 80 \\ + 13 \\ \hline 93 \end{array}$$

The second strategy will be called "Partial Sums." In this strategy students still think about the numbers as composite numbers and not just digits. Students can start to add with the ones place or the hundreds place, but they must remember that they are adding 200 plus 300 not 2 plus 3 when they record their answers.

Example:

$$\begin{array}{r} 36 \\ + 57 \\ \hline 80 \\ \\ + 13 \\ \hline 93 \end{array}$$

The third strategy we will discuss will be named "Opposite Change." Students should be familiar with "making tens" as a strategy for adding basic addition facts. In this strategy students subtract or add from one of the numbers to make compatible numbers, usually tens because they are easier to add. Whatever operation I use on the first addend, I have to use the opposite operation on the second addend to keep the problem the same.

Example:

$36 - 3$ Think: Because I added 3 to 57, I have to subtract 3 from 36 to keep the problem the same. 36 subtract 3 is 33.

$+ 57 + 3$ Think: if I add 3 to 57 it will make it 60.

$$\begin{array}{r} 33 \\ + 60 \\ \hline 93 \end{array}$$

Intended Learning Outcomes

1. Demonstrate a positive learning attitude.
2. Develop social skills and ethical responsibility.

Instructional Procedures

Invitation to Learn

Write the following story problem on the board and ask students to solve the problem using base ten blocks or any other method that they choose. Problem: Chelsea bought 26 pieces of bubblegum and 19 jawbreakers at the store. How many pieces of candy did she have altogether? After students have had an opportunity to solve the problem using their manipulatives, ask students to share how they solved the problem. Did some of the students use similar methods? Do the strategies make sense to other students? Write the steps on the board as students explain their methods.

Instructional Procedures

Directions to make an Addition/Subtraction Mat

Divide a 11" X 14" piece of cardstock on the 14" side into four sections each measuring 3 ½".

Draw lines with a black marker to separate the four sections.

Glue a 3 ½" X 11" piece of colored cardstock in the third section.

Label the sections as follows: 1) First Addend 2) Second Addend 3) Thinking Area (different color cardstock) 4) Sum.

Turn the cardstock over to make the subtraction mat. Divide the cardstock into four 3 ½" sections.

Glue a 3 ½" X 11" piece of colored cardstock in the second section.

Label the sections as follows: 1) Minuend 2) Thinking Area 3) Subtrahend 4) Difference.

Partner Spin and Add

Organize students into partner groups. Pass out an Addition/ Subtraction Mat to each student. To each partnership, pass out base ten blocks and a Spin and Add template with a transparent spinner. Students need their math journals to record their strategies.

Have each player spin the spinner. The highest number goes first.

The first student spins the spinner, and both students model the number using their base ten blocks on their Addition/Subtraction Mat.

The second student spins the spinner and again both students model the number on their mats using the base ten blocks.

Each player writes the equation in his/her journal and then writes or draws pictures explaining how he/she solved the problem. Students share their answer and method with each other. If students get the same answer they celebrate and continue with a new problem. If they get different answers then they need to go back and work the problem out together.

When students have completed the activity and cleaned up their materials, have them bring their journals with them to the rug for math meeting. Call on students to share some of their solution strategies with the other students by either drawing on the whiteboard or verbally explaining.

Two and Three Digit Addition Strategies

Pass out the Addition Strategies Foldable to each student. Explain how to fold the paper and where to cut the flaps.

Model together an addition problem using "expanded form." Then, have the students make up a problem on their own, write it on the opposite side of the flap, and solve it using the same method. Continue using "partial sums," and "opposite change" strategies.

Partner Roll and Add

Organize your students into partner groups. Pass out both a tens and a ones number cube to each partnership.

Students take turns rolling both cubes to create a two-digit number. After both numbers have been created then the students write the addition equation in their journals.

Have the students practice solving the problems using expanded form, partial sums, or opposite change strategies for addition.

Extensions

Curriculum Extensions/Adaptations/ Integration

Provide larger numbered spinners or a hundreds place cube for advanced learners during these activities.

Provide smaller numbered spinners and allow learners with special needs to continue using manipulatives to assist them in solving the problems.

Have special needs students orally explain their thought process to you if writing is a struggle.

Family Connections

Write a note home to family members explaining that you will be teaching to their children different strategies for addition before you teach the standard algorithm. Give parents some examples and ask them to support you by helping their children learn these strategies too.

Have students take a copy of the Spin and Add spinner home and play with a family member using an assigned strategy.

Assessment Plan

Walk around the room while students are participating in the activities. Are they able to model the numbers correctly? Do they understand place value, and are they lining up their equations properly? Are they able to solve the problems? What strategies are they using most often?

Ask a partner group to explain their thoughts and strategies to you.

Look at students' journals and evaluate their work to see where students are struggling.

Bibliography

Research Basis

Burns, M., (November 07). Nine Ways to Catch Kids Up: How do we help floundering students who lack basic math concepts? *Educational Leadership*. 65(3) 16-21.

In this article, Marilyn Burns discusses nine essential strategies that help struggling mathematics learners become successful. Although all of the strategies are helpful, there are two strategies that I would like to focus on. The first strategy is building a routine of support. Burns discusses a four-stage lesson process that supports the students' learning and understanding of the concept before they are asked to work independently. Secondly, she discusses the importance of fostering student interaction with each other about their math knowledge either through sharing with the whole class, partners, or table groups.

Strong, R., Thomas, E. Perini, M. & Silver, H. (February 2004). Creating a Differentiated Mathematics Classroom. *Educational Leadership*. 61(5) 73-78.

The researchers in this article state that students acquire math using four different styles. Although students can work in all four styles, most find one or two styles comfortable and work within them. The four styles are: Mastery, Understanding, Interpersonal, and Self- Expressive. The authors also explain the importance of using the nine effective teaching strategies. Mathematical differentiation and students' achievement can take place when educators design units that include all four dimensions of mathematical learning, use a variety of teaching strategies and create assessments that correspond with the learning styles.

Authors

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