**Comparing Addition Strategies**

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| This purpose of this lesson is to give students the opportunity to problem solve and analyze other student solutions while working on adding two-digit numbers. This lesson assumes students have had previous experience with multiple addition strategies and that the class has posted strategy supports. |

**NC Mathematics Standard(s):**

**NC.NBT.5** Demonstrate fluency with addition and subtraction, within 100, by:

* Flexibly using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
* Comparing addition and subtraction strategies, and explaining why they work.
* Selecting an appropriate strategy in order to efficiently compute sums and differences

**Standards for Mathematical Practice:**

2. Reason abstractly and quantitatively

3. Construct viable arguments and critique the reasoning of others.

1. Use appropriate tools strategically.
2. Attend to precision.

**Student Outcomes:**

* I can solve addition problems using place value strategies.
* I can compare addition strategies and explain why they work.

**Math Language:**

Students will explain similarities and differences in strategies used by Jack and Sarah. I would expect to hear phrases like: I counted on…, I broke apart…, I added…, I grouped tens, ones,…, The strategies are similar/different because…, I noticed…,

**Materials:** **Materials:**

* Anchor chart
* Base ten blocks
* Number lines
* Hundreds boards
* Task sheet

**Advanced Preparation:**

* Anchor chart showing previously discussed addition strategies
* Copy task sheet
* Choose student solutions for discussion portion of lesson. Look for strategies that solve in a similar way maybe using a different tool e.g. number line, hundreds board.

**Launch:**

Solving an Addition Problem (5-10 minutes)

**Say:** Can we solve problems in more than one way? Today we will be comparing how you solve an addition problem with how students from another school solved the same problem.

**Introduce the Task:** Jack and Sarah added 28 + 47 using base ten blocks, but used different strategies. Your job today is to solve this same problem using your favorite strategy. Then you’ll look at and answer questions about the way Jack and Sarah solved the problem.

**Teacher Note:** Allow students a few minutes to individually solve the problem. As students solve the same problem that Jack and Sarah solved using their preferred strategy, monitor and observe. Are students making connections to prior learning? What strategies are students using to solve? What mathematical tools are students using (unifix cubes, open number lines, base ten blocks, etc.)?

Then partner students and pass out the handout with Jack and Sarah’s solutions.

**Explore:**

1. Students will work with a partner to compare Jack and Sarah’s strategies using the following questions:
   1. How did Jack solve the problem? Will his strategy always work?
   2. How did Sarah solve the problem? Will her strategy always work?
   3. How are their strategies similar or different?
   4. How was your strategy similar or different from Jack or Sarah’s strategies?
2. Continue to monitor, observe, and listen. Select student samples that show similarities and differences between student’s personal solution and either Jack’s or Sarah’s solution. Also make note of responses that realize Jack’s counting on strategy will always work whereas Sarah’s strategy of making ten may not. Also, look for responses that clearly explain each of the strategies
3. Students will then compare their personal solution to Jack **or** Sarah’s using the same questions from above. Allow students time to analyze individually.

Other student prompts:

* Why do you think he or she decomposed the number that way?
* Can numbers be decomposed differently?
* Can numbers be grouped in different ways?

**Discuss:**

Bring the group back together to share their responses to the questions with the class

Ask: How are Jack and Sarah’s strategies similar?

* Possible Student Response: *They both used tens. Jack counted his tens and ones separately and then combined them. Sarah kept one number the same (28), but realized that if she took 2 from 47. She would have a friendly number of 30 which made it easier to add 45.*
* Why do you think Sarah took 2 from 47 and gave it to 28?

Ask: How is your strategy similar or different from Jack or Sarah’s strategy.

* Answers will vary based on students’ solutions.

**Evaluation of Student Understanding**

**Informal Evaluation:**

Observe and monitor students as they solve the problem. How are they making sense of the problem? Are students using mathematical vocabulary as they solve and discuss the problem? How are students comparing different solutions?

**Formal Evaluation/Exit Ticket:**

Students will solve 36 +19 using two strategies. Students will compare solutions to Sarah’s and ask: “Which one of these strategies is most like Sarah’s making a ten?”

**Meeting the Needs of the Range of Learners**

**Intervention:**

* Act out each strategy using manipulatives. For example, use number line or hundreds board to physically act out Jack’s counting on strategy. Use place value blocks to physically act our Sarah’s regrouping strategy.

**Extension:**

* Error Analysis: Give students another problem that does not require regrouping (33 + 54). Sarah thinks her strategy will work for this problem. Do you agree with her? Why or why not? What do you think the best strategy is for this problem? Explain you thinking.

**Possible Misconceptions/Suggestions:**

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| **Possible Misconceptions** | **Suggestions** |
| * Students may not be able to explain the similarities/differences in strategy. * Students may have difficulty regrouping the ones to make another ten | * Use manipulative to act out the strategies. * Use place value blocks to model trading 10 ones for a ten |

**Possible Solutions:**

Possible solutions are included in the “discuss” portion of the lesson.

**Comparing Addition Strategies**

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|  | **Jack’s Thinking:**  I counted my tens first, so 10, 20, 30, 40, 50, 60.  Then I counted on with the ones, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75.  So, 28 + 47 = 75 |
|  | **Sarah’s Thinking:**  First, I saw that I had enough ones to make a ten.  I gave 2 ones from the 47 to the 28 to make 30.  I added 30 to 45 to make 75.  So, 28 + 47 = 75 |

**Questions to Consider:**

How did Jack solve the problem? Will his strategy always work?

How did Sarah solve the problem? Will her strategy always work?

How are their strategies similar or different?

How was your strategy similar or different from Jack or Sarah’s strategies?