**Number Talks: Subtraction**

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| In this lesson, students solve subtraction problems mentally and share strategies. Number Talks build understanding of quantities, numerical relationships, and procedural fluency. |

**NC Mathematics Standard(s):**

**Number and Operations in Base Ten**

**NC.3.NBT.2** Add and subtract whole numbers up to and including 1,000.

* Use estimation strategies to assess reasonableness of answers.
* Model and explain how the relationship between addition and subtraction can be applied to solve addition and subtraction problems.
* Use expanded form to decompose numbers and then find sums and differences.

**Standards for Mathematical Practice:**

2.  Reason abstractly and quantitatively.

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

4.  Model with mathematics.

6.  Attend to precision.

**Student Outcomes:**

* I can mentally solve subtraction problems and share my thinking.

**Math Language:** What words or phrases do I expect students to talk about during this lesson?

* **difference**
* **distance**
* **compare**
* **decompose**
* **place value**

**Materials:**

* Anchor chart or smartboard
* Markers of various colors

**Advance Preparation**:

* Select problems to pose to students that will highlight particular subtraction strategies
* Before you begin your first number talk, establish the number talk routine norms. Students gather in a common meeting area near the Smartboard or chart. They will not need paper or pencil for this activity. Teachers pose a problem and students will mentally solve the problem in whatever way makes sense to them. When students have a solution and can describe their strategy, they will place a quiet thumb at their chest to communicate with the teacher that they are ready to share their solution and strategy. As additional wait time passes, students are encouraged to think of different strategies and hold up additional fingers to show the number of solution strategies they have.

**Launch:**

1. Posing the Problem (2 minutes)

* Teacher writes the following problem on chart/smartboard:

20 - 10

**Explore:**

1. Solving the Problem (3-5 minutes)

* Give students private think time to solve the problem mentally. They hold up their thumb to indicate when they have a solution and can share their strategy. Giving ample wait time is imperative.

**Discuss:**

1. Sharing Our Thinking (5-10 minutes)

* Ask students to share their answers. Teacher records all given answers. Many students will “just know” the answer to 20 - 10. They may say that 10 + 10 is 20 or 20 is a double of 10. Don’t spend a lot of time on this one.
* Repeat this process (Launch, Explore, and Discuss) with the following problems:

20 - 16

30 - 10

30 - 12

* Ask several students to share their solutions. Use a different color to record each student's’ strategies, and press for clarification when needed. Listen, write and ask clarifying questions to ensure students’ thinking is accurately represented. Resist putting words in their mouths. In this series of problems, you want to see if students will use 20 - 10 as a starting point for 20 - 16. A student might say, “I know that 20 - 10 is 10, so I subtracted 6 more and got 4.”

**Evaluation of Student Understanding**

Informal Evaluation:

Observation during the number talk: What strategies do students share? Who participates? What do they say? How do they explain their thinking?

Formal Evaluation/Exit Ticket:

Create an exit ticket with a problem similar to the one you have posed to see what strategy students use.

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

**Intervention:**

* Conduct a small group number talk, modifying the numbers to give equal access to the strategy.
* One on one interview, posing an equation and conducting a Number Talk with the specific student.

**Extension:**

Ask students in their math journal to explain connection between strategies shared in the Number Talk.

**Possible Misconceptions/Suggestions:**

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| **Possible Misconceptions** | **Suggestions** |
| 1. Students may think fast is better. 2. Addition: A student may think there is only one way to solve. 3. Subtraction: Students try to break apart by place and then rearrange the numbers to “make it work.” For example:   47-39  40-30=10  7-9= “I can’t do that” so 9-7=2.  10+2=12 | 1. Give long wait time. 2. Elicit and record multiple strategies that can be applied to other problems. 3. Ask the student to model their thinking with cubes, pictures, number lines. Is 7-9 the same as 9-7? Does order matter in subtraction? |

**Special Notes:**

* Sometimes you may want to make connections between strategies.
* If the strategy you are hoping to elicit does not surface:
  + Continue to give similar problems in subsequent number talks. As students become comfortable with mental math and talking about their thinking, hopefully they will begin exploring other strategies.

**Possible Solutions:**

The above string of problems was chosen to highlight the strategy of removing the subtrahend in parts. The problems are set up so the first problem sets students up to just remove another part for the second problem.

**Activity Sheet (for teacher)**

The following sets of problems can be used in subsequent number talks to continue developing flexibility in strategy use for addition and subtraction.

**Subtraction**

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| **23 - 19**  **23 - 16**  **23 - 14**  **23 - 9**  **Strategy: Adding Up** | **30 - 24**  **34 - 29**  **32 - 23**  **36 - 27**  **Strategy: Adding Up** | **70 - 61**  **70 - 34**  **74 - 49**  **74 - 36**  **Strategy: Adding Up** |
| **26 - 10**  **26 - 13**  **28 - 10**  **28 - 15**  **Strategy: Removal** | **47 - 10**  **47 - 16**  **47 - 20**  **47 - 24**  **Strategy: Removal** | **69 - 30**  **69 - 35**  **69 - 50**  **69 - 52**  **Strategy: Removal** |

This lesson is adapted from:

* Making Number Talks Matter by Cathy Humphries & Ruth Parker
* Number Talks by Sherry Parrish