**Multiplication Number Talks**

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

**NC Mathematics Standard(s):**

**Operations and Algebraic Thinking**

**NC.3.OA.1** For products of whole numbers with two factors up to and including 10:

* Interpret the factors as representing the number of equal groups and the number of objects in each group.
* Illustrate and explain strategies including arrays, repeated addition, decomposing a factor, and applying the commutative and associative properties.

**NC.3.OA.6** Solve an unknown factor problem, by using division strategiesand/or changing it to a multiplication problem.

**NC.3.OA.7** Demonstrate fluency with multiplication and division with factors, quotients and divisors up to and including 10.

* Know from memory all products with factors up to and including 10.
* Illustrate and explain using the relationship between multiplication and division.
* Determine the unknown whole number in a multiplication or division equation relating three whole numbers.

**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 multiplication problems and share my thinking.

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

* **factor**
* **product**
* **array**
* **decompose**
* **equal groups**

**Materials:**

* Anchor chart or smartboard
* Markers of various colors

**Advance Preparation**:

* Select problems to pose to students that will highlight particular multiplication 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)

Write the following problem on chart/board:

2 x 6

**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. Record all given answers. 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.

Repeat this process (Launch, Explore, and Discuss) with the following problems:

4 x 6

4 x 7

3 x 7

8 x 6

**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. If students use 4 x 6 to solve 4 x 7, they may add 6 to 24 instead of adding 4 to 24. 3. If students have memorized multiplication combinations, they may be unwilling or unable to explain strategies to solve those combinations. You may have to ask questions to help them use other strategies. | 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. |

**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.
  + Pose a question about a “student next door” who used 4 x 6 to think about 4 x 7. What do you think this student was thinking about? How did he/she use 4 x 6 to help solve 4 x 7?

**Possible Solutions:**

The above string of problems was chosen to highlight the strategy of using partial products or breaking a factor into addends. The problems build in such a way that students can use solutions from previous problems and “add another group” or double one factor.

**Activity Sheet (for teacher)**

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

**Multiplication**

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| **2 x 8**  **4 x 8**  **3 x 8**  **7 x 8**  **Strategy: Partial Products/ Breaking a Factor into Addends** | **7 x 5**  **7 x 2**  **7 x 10**  **7 x 50**  **Strategy: Partial Products/ Breaking a Factor into Addends** | **9 x 5**  **9 x 10**  **9 x 9**  **Strategy: Making Landmark or Friendly Numbers** |
| **5 x 19**  **Strategy: Making Landmark or Friendly Numbers- Application- After several number talks modeled after the previous one, where students can discover that they can use a friendly number to solve a more difficult problem, can they use that to solve this problem?** | **1 x 80**  **2 x 40**  **4 x 20**  **8 x 10**  **16 x 5**  **Strategy: Doubling and Halving** | **18 x 5**  **Strategy: Doubling and Halving- Application- After several number talks modeled after the previous one, where students can discover that doubling one factor and halving the other results in the same product, can they use that to solve this problem?** |

This lesson is adapted from:

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