Core Content

Cluster Title: Multiply and divide within 100.

**Standard 7:** Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 x 5 = 40, one also knows 40 ÷ 5 = 8) or properties of operations. By the end of grade 3, know from memory all products of two one-digit numbers.

MASTERY Patterns of Reasoning:

**Conceptual:**
- Students will understand the inverse relationship of multiplication and division.
- Students will know from memory all products of two one-digit numbers.
- Students will understand commutative and distributive properties.

**Procedural:**
- Students can apply a strategy to solve multiplication and division equations.
- Students can solve multiplication and division problems fluently (i.e., flexibly, accurately, efficiently, and appropriately).
- Students can show how a problem was solved using commutative/distributive properties.

**Representational:**
- Students can illustrate multiplication number bonds as a means of developing fluency.

Supports for Teachers

**Critical Background Knowledge**

<table>
<thead>
<tr>
<th>Conceptual:</th>
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<tbody>
<tr>
<td>Students will know multiplication fact families.</td>
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<tr>
<td>Students will understand the commutative, associative, and distributive properties of multiplication.</td>
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<tr>
<td>Students will understand the identity and zero properties of multiplication.</td>
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</tbody>
</table>

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Procedural:
Students can solve multiplication and division equations using a variety of strategies.

Representational:
Students can show how a problem was solved using commutative/distributive properties.

Academic Vocabulary and Notation
product, factor, dividend, divisor, quotient, fact family, related facts, $\times$, $\div$, commutative property, distributive property

Instructional Strategies Used
Note: Fluency in mathematics means solving problems flexibly, accurately, efficiently, and appropriately. Be certain that students have conceptual understanding of multiplication before they begin to commit the products of two one-digit numbers to memory.

- Doubles ($2 \times 2 = 2 + 2$)
- Double and double again ($4 \times 2 = (2 \times 2) \times 2$)
- Halve, then double ($6 \times 8 = (3 \times 8) + (3 \times 8)$)
- Doubles plus one more set ($3 \times 7 = (2 \times 7) + 7$)
- Add one more set ($6 \times 7 = (5 \times 7) + 7$)
- Decomposing into known facts (i.e., use facts you know to solve the ones you don’t)
- Halves ($12 \div 2 = 6$)
- Doubles and halving ($36 \div 4 = 72 \div 2 = 144 \div 1$)—you double the dividend and halve the divisor to make a simpler problem
- Multiplying by zero and one
- Patterns in 9’s
- Fact families
- Number bonds

Resources Used


Literature resources:
http://www.graniteschools.org/depart/teachinglearning/curriculum/instruction/math/elementarymathematics/Pages/default.aspx

Multiplication chart
<table>
<thead>
<tr>
<th>Assessment Tasks Used</th>
<th>Problem Task:</th>
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</thead>
<tbody>
<tr>
<td><strong>Skill-Based Task:</strong></td>
<td>There are 5 tables in the lunchroom. Six students sit at each table. How many</td>
</tr>
<tr>
<td>4 x 6 = ____</td>
<td>students are in the lunchroom?</td>
</tr>
<tr>
<td>7 x 9 = ____</td>
<td>Mari has 48 crayons. She knows that 8 crayons can fit in a box. How many</td>
</tr>
<tr>
<td>9 x 10= ____</td>
<td>boxes will she need?</td>
</tr>
<tr>
<td>56 ÷ 8 = ____</td>
<td></td>
</tr>
<tr>
<td>72 ÷ 9 = ____</td>
<td></td>
</tr>
</tbody>
</table>

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