



## HANDOUT 2.2.3

### Learning Progression: Mathematics Example

**Directions:** Refer to this handout as you learn about the learning progression between standards that the Center for Standards and Assessment Implementation (CSAI) team developed using the Common Core State Standards for Mathematics (CCSSM).

#### Target Standard: Operations and Algebraic Thinking

“Interpret the products of whole numbers, e.g., interpret  $5 \times 7$  as the total number of objects in 5 groups of 7 objects each.” (CCSSM 3.OA.1)

#### Prior Knowledge: Operations and Algebraic Thinking

“Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns and write an equation to express the total as a sum of equal addends.” (CCSSM 2.OA.4)

“**Hidden**” Prior Knowledge: Arrange objects in groups and arrays with fluency and precision.

Building Blocks of Standard	Notes
<p><u>Block 1</u> Practice repeated addition of objects arranged in rectangular arrays with progressively more rows and columns (beyond 5 rows and 5 columns)</p> <p>EX: <math>7+7+7+7</math> and <math>2+2+2+2+2+2+2</math></p>	<p><i>(Sample Instructional Strategy)</i> Students should practice this until it is no longer cognitively demanding so that they are receptive to the idea of multiplication as a “shortcut to repeated addition.”</p> <p><i>(Math Practice Standard 2)</i> Students need to be comfortable toggling between symbolic and concrete representations of repeated addition.</p> <p><i>(Connections Across Subjects)</i> They can practice using these different representations in science (planning rows of plants for a class garden, counting tally marks in data collection) and art (counting, grouping, and arranging shapes, objects, colors).</p>
<p><u>Block 2</u> Describe repeated addition like <math>2+2+2+2</math> as “the number 2, added four times,” and then, “four times 2.”</p>	<p><i>(Shift in Language)</i> This important linguistic Building Block prepares students for the conceptual shift from addition to multiplication.</p> <p><i>(Math Practice Standard 6)</i> It will be important for students to use this new language with precision, as it is deeply connected to the underlying conceptual shift from addition to multiplication.</p>
<p><u>Block 3</u> Introduce multiplication as a shortcut to repeated addition.</p>	<p><i>(Sample Instructional Strategy)</i> As appropriate, encourage students to use the 100’s square, addition table, and multiplication table.</p> <p><i>(Math Practice Standard)</i> Students can begin to notice regularities in the 100’s square, addition table, and multiplication table, and express these regularities in terms of multiplication.</p>

This example is used with permission from the Center for Standards and Assessment Implementation (CSAI) resource: *Building Blocks, Learning Goals, and Success Criteria: Planning Instruction and Formative Assessment for K-8 Math Standards*. For more information on CSAI resources, please visit the website: <http://csai-online.org/curriculumandinstruction> .