

#### Vertical Progression:

<b>Kindergarten</b>	<p><b>K.CC.B Count to tell the number of objects.</b></p> <ul style="list-style-type: none"> <li>○ <b>K.CC.B.5</b> Count to answer “how many?” questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.</li> </ul>
<b>1<sup>st</sup> Grade</b>	<p><b>1.OA.D Work with addition and subtraction equations.</b></p> <ul style="list-style-type: none"> <li>○ <b>1.OA.D.7</b> Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. <i>For example, which of the following equations are true and which are false? <math>6 = 6</math>, <math>7 = 8 - 1</math>, <math>5 + 2 = 2 + 5</math>, <math>4 + 1 = 5 + 2</math>.</i></li> </ul>
<b>2<sup>nd</sup> Grade</b>	<p><b>2.OA.C Work with equal groups of objects to gain foundations for multiplication.</b></p> <ul style="list-style-type: none"> <li>○ <b>2.OA.C.3</b> Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.</li> <li>○ <b>2.OA.C.4</b> Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.</li> </ul>
<b>3<sup>rd</sup> Grade</b>	<p><b>3.OA.A Represent and solve problems involving multiplication and division.</b></p> <ul style="list-style-type: none"> <li>○ <b>3.OA.A.1</b> Interpret products of whole numbers, e.g., interpret <math>5 \times 7</math> as the total number of objects in 5 groups of 7 objects each. <i>For example, describe a context in which a total number of objects can be expressed as <math>5 \times 7</math>.</i></li> </ul> <p><b>3.OA.D Solve problems involving the four operations, and identify and explain patterns in arithmetic.</b></p> <ul style="list-style-type: none"> <li>○ <b>3.OA.D.9</b> Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. <i>For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.</i></li> </ul>

#### Students will demonstrate command of the ELG by:

- Counting by twos.
- Sorting a set of objects into two equal groups and expressing that when there is nothing left over after sorting the objects, then that set is even.
- Sorting a set of objects into two equal groups and expressing that when there is one left over after sorting the objects, then that set is odd.
- Writing an equation to express the total as a sum of equal addends.
- Explaining why the sum of two equal addends will always be even.
- Describing numbers as even or odd using objects, drawings, and models.

#### Vocabulary:

- addend
- array
- column
- equal
- equal groups
- equation
- even
- odd
- pairing
- row
- sum

#### Sample Instructional/Assessment Tasks:

##### 1) Standard(s): 2.OA.C.3

Source: [www.k-5mathteachingresources.com/support-files/even-odd-scoop.pdf](http://www.k-5mathteachingresources.com/support-files/even-odd-scoop.pdf)

Item Prompt: Even Odd Scoop



Materials: Container of counters, spoons of different sizes

- 1) Scoop a spoonful of counters.
- 2) Group the counters in pairs.
- 3) Show how many counters you have and whether this number is even or odd.
- 4) Repeat at least 5 times.

##### 2) Standard(s): 2.OA.C.3

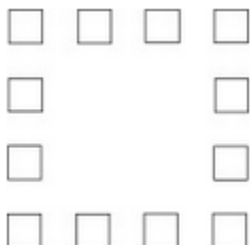
Source: Illustrative Mathematics

[www.illustrativemathematics.org/content-standards/2/OA/C/3/tasks/620](http://www.illustrativemathematics.org/content-standards/2/OA/C/3/tasks/620)

Item Prompt:

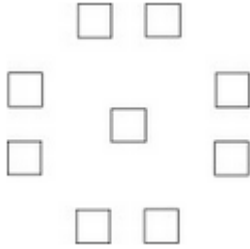
Lin wants to put some red and blue tiles on a wall for decoration. She is thinking about several different patterns of tiles she could create. She wants to choose a pattern that would let her use exactly as many red tiles as blue tiles.

- a. Is it possible to create the pattern below using the same number of red tiles as blue tiles? Explain.

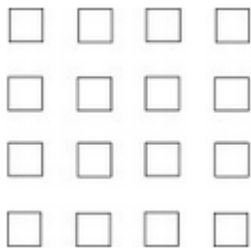


ELG 2.OA.C: Work with equal groups of objects to gain foundations for multiplication

- b. Is it possible to create the pattern below using the same number of red tiles as blue tiles? Explain?



- c. Can you figure out how many tiles are in the pattern below without counting them one by one? Is it possible to create this pattern using the same number of red tiles as blue tiles? Explain.



- d. Of the patterns above, which ones have an even number of tiles? Which ones have an odd number of tiles? If Lin wants to use an equal number of red tiles and blue tiles, should she use a pattern with an even number of tiles, or one with an odd number of tiles? Explain.

**Solution:**

- The first arrangement can be divided into two equal parts; for example, we can divide the pattern into the top half and the bottom half. This means that the number of tiles in this arrangement is even.
- If we try pairing tiles in the second arrangement, we end up with one tile left over. Therefore, the number of tiles in this arrangement is odd.
- The tiles in this arrangement are in a 4-by-4 array, so the total number of tiles is  $4 + 4 + 4 + 4 = 16$ . Again, we can divide this arrangement into a top half and a bottom half, so the number of tiles is even.
- When the number of tiles is even, Lin can divide the tiles into two equal-sized groups, one to be made of red tiles and one to be made of blue tiles. She can then create the pattern using an equal number of tiles of each color. When the number of tiles is odd, there will have to be a color (red or blue) that has at least one more tile than the other color. Therefore, Lin should use a pattern with an even number of tiles if she wants to use the same number of red and blue tiles.