

# Exploring Multiples

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<b>Strand:</b>	Patterns, Functions, and Algebra
<b>Topic:</b>	Exploring patterns through the use of multiples
<b>Primary SOL:</b>	3.16 The student will identify, describe, create, and extend patterns found in objects, pictures, numbers, and tables.
<b>Related SOL:</b>	3.5, 3.6

## Materials

- Hundreds Chart (attached)
- Linking cubes
- Bags
- Recording Sheet (attached)
- Crayons or markers
- Multiplication Table (attached)

## Vocabulary

*missing term, multiples, pattern, rule*

## Student/Teacher Actions: What should students be doing? What should teachers be doing?

Skip counting can provide practice with multiples while deepening students' understanding of multiplication facts. Students are able to observe visual patterns resulting from identifying the multiples of a number.

1. Distribute the Hundreds Chart and bags of linking cubes. Beginning with the number 2, have students skip count by twos, marking the multiples of 2 with linking cubes on the chart. Students will begin placing the linking cubes as they skip count. However, many students will soon see the pattern of every other number and begin placing the cubes according to the pattern rather than the skip counting. Have students describe the pattern.
2. Have students practice skip counting by threes, marking the multiples of three on the chart. It is important that students be able to describe verbally the pattern that is formed on the chart. Repeat the process for skip counting by fours, fives, sixes, and so forth up to 12s.
3. Explain to students that understanding the process of skip counting allows you to find missing terms within patterns. Write the following pattern on the board: 4, 8, 12, \_\_\_\_, 20, 24. Ask, "Based on the numbers that are given, can you tell what these numbers are multiples of?" Once students understand that these numbers are multiples of four, they know that they are skip counting by four. Ask, "Now that we know we are skip counting by four, what is the missing term?" Students may refer back to their hundreds chart, if needed. More examples like this can be done with different patterns.
4. At a later time, have students repeat step 2. This time, distribute crayons or markers and copies of the Recording Sheet, and have students record the patterns on the sheet by coloring in each skip-counted number. Follow this activity with questions designed to

help students understand the relationship between skip counting the multiples of a number and multiplication. For example, after they have skip counted by three and colored in the multiples of three, ask, “What number is the fourth colored multiple?” When they respond “12,” ask what 4 times 3 equals. Continue this type of questioning so that students come to better understand multiples of a number and how multiplication is a shortcut for skip counting.

5. Have students examine their recording sheets and describe the differences and similarities among the patterns. Ask whether 239 is a multiple of 6. Ask how they know.
6. Distribute the Multiplication Table activity sheet, and have students use their Recording Sheet, on which they marked all of the multiples, to transfer these findings to the table. Students need to continue using the skip-counting method to complete the table. Discuss the patterns that form.

### Assessment

- **Questions**
  - If a number is a multiple of six, is it also a multiple of two? Of four?
  - How is a number a multiple? Explain by giving an example.
  - How can our knowledge of multiples help us when finding a missing term in a pattern?
  - What is the missing term of this pattern: 3, 6, 9, \_\_\_\_\_, 15? How were you able to solve this?
- **Journal/writing prompts**
  - Explain what is meant by the word *multiple*.
  - Describe the pattern found on the multiplication table. Explain how you determined there is a pattern. Tell how this increased your understanding of the word *multiple*.

### Extensions and Connections (for all students)

- Direct students to skip count on the Hundreds Chart by twos and then by threes, marking the multiples of two with one color linking cube and the multiples of three with a different color cube. Ask which numbers have two colors on them (6, 12, 18 ...) Ask why these numbers have two colors. Ask, “Why is ‘common multiples’ a good name for this set of numbers?”
- Have students use calculators to skip count and find new patterns to share with classmates.

### Strategies for Differentiation

- Provide students with enlarged recording sheets.
- Provide students with enlarged copies of the multiplication table.
- Use technology to model filling in the recording sheet for students.
- For students with a good understanding of patterns for multiples, have them re-create the shape of various multiples (on hundreds charts) on grid paper.

**Note: The following pages are intended for classroom use for students as a visual aid to learning.**

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### Hundreds Chart

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>
<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b>	<b>26</b>	<b>27</b>	<b>28</b>	<b>29</b>	<b>30</b>
<b>31</b>	<b>32</b>	<b>33</b>	<b>34</b>	<b>35</b>	<b>36</b>	<b>37</b>	<b>38</b>	<b>39</b>	<b>40</b>
<b>41</b>	<b>42</b>	<b>43</b>	<b>44</b>	<b>45</b>	<b>46</b>	<b>47</b>	<b>48</b>	<b>49</b>	<b>50</b>
<b>51</b>	<b>52</b>	<b>53</b>	<b>54</b>	<b>55</b>	<b>56</b>	<b>57</b>	<b>58</b>	<b>59</b>	<b>60</b>
<b>61</b>	<b>62</b>	<b>63</b>	<b>64</b>	<b>65</b>	<b>66</b>	<b>67</b>	<b>68</b>	<b>69</b>	<b>70</b>
<b>71</b>	<b>72</b>	<b>73</b>	<b>74</b>	<b>75</b>	<b>76</b>	<b>77</b>	<b>78</b>	<b>79</b>	<b>80</b>
<b>81</b>	<b>82</b>	<b>83</b>	<b>84</b>	<b>85</b>	<b>86</b>	<b>87</b>	<b>88</b>	<b>89</b>	<b>90</b>
<b>91</b>	<b>92</b>	<b>93</b>	<b>94</b>	<b>95</b>	<b>96</b>	<b>97</b>	<b>98</b>	<b>99</b>	<b>100</b>

**Recording Sheet**

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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**Multiplication Table**

<b>X</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
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