

## Preliminary Planning Sheet

### Grade 5 – Cans and Bottles

**Domain(s)**

Operations and Algebraic Thinking

**Standard(s)**

5.OA.B.3

**Mathematical Practices**

MP.1 MP.2 MP.3 MP.4 MP.5 MP.6 MP.7 MP.8

**Major Underlying Mathematical Concepts**

- Generate two numerical patterns using two rules
- Determine an unknown term within a pattern
- Number sense to 360
- Ordinal numbers
- Linear relationships (functions)
- Addition/Multiplication

**Problem Solving Strategies**

- Model (manipulatives)
- Diagram/Key
- Table
- Number line
- Graph (Students may independently select graph paper.)

**Formal Mathematical Language and Symbolic Notation**

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|---|---|
| <ul style="list-style-type: none"> <li>• Model</li> <li>• Diagram/Key</li> <li>• Table</li> <li>• Graph</li> <li>• Number line</li> <li>• Axis</li> <li>• Pattern</li> <li>• Multiples</li> <li>• Odd/Even</li> <li>• Total/Sum/Product</li> <li>• Amount</li> <li>• Per</li> <li>• Ordinal numbers: 1st, 2nd, 3rd ...</li> </ul> | <ul style="list-style-type: none"> <li>• Day, week, month</li> <li>• Monday, Tuesday ...</li> <li>• Input/Output</li> <li>• Variable</li> <li>• Rules: <math>12 \cdot d = c</math>; <math>(7 \cdot d) - 2 = b</math></li> <li>• Dozen</li> <li>• Equation</li> <li>• Linear function</li> <li>• Greater than (&gt;)/Less than (&lt;)</li> <li>• Multiplication</li> <li>• Addition</li> <li>• Number</li> </ul> |
|---|---|

## Possible Solution(s)

The fifth graders collect 120 cans and 68 bottles on the tenth day, and 360 cans and 208 bottles on the thirtieth day.

Rule
<b>d</b> is day
<b>c</b> is cans
<b>b</b> is bottles
$12 \cdot d = c$
$(7 \cdot d) - 2 = b$

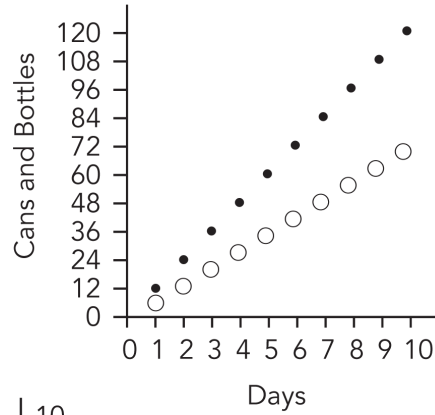
Key
• is cans
○ is bottles

$$12 \cdot 10 = 120$$

$$(7 \cdot 10) - 2 = 68$$

$$12 \cdot 30 = 360$$

$$(7 \cdot 30) - 2 = 208$$



Day	1	2	3	4	5	6	7	8	9	10
Cans	12	24	36	48	60	72	84	96	108	120
Bottles	5	12	19	26	33	40	47	54	61	68

## Possible Connections

Below are some examples of mathematical connections. Your students may discover some that are not on this list.

- Patterns: day +1 (odd-even), cans +12 (multiples, all even), bottles +7 (odd-even)
- Generalize a rule and use the rule to solve the task for days other than the 10th and 30th days.
- There is a difference of 140 bottles between the 10th day and the 30th day.
- Find the number of cans and bottles collected each day for a total of 4 weeks or 1 month.
- The fifth graders found a total of 568 cans and bottles on the 30th day.
- Solve more than one way to verify answer.
- On day 30, 10 friends could collect 36 cans each, and about 20 bottles each.
- If the students start collecting on Monday, the tenth day is Wednesday.
- 36 cans is 3 dozen.