



## Strip Diagrams & Equations in 1- & 2-Step Problems

**Purpose** This Ramp Up activity connects problem contexts, strip diagrams, and equations. Students are given a word problem to understand. Then they are given strip diagrams and equations with missing numbers and labels. Students use the context of the problem to fill in the missing numbers and labels.

**About the Problems:** Problems #1–#4 are one-step problems. Problems #5 and #6 are two-step problems.

- |   |   |   |   |
|---|---|---|---|
| <input checked="" type="checkbox"/> One-step problems | <input checked="" type="checkbox"/> Strip diagram | <input type="checkbox"/> Table                  | <input checked="" type="checkbox"/> Tutoring/Intervention |
| <input checked="" type="checkbox"/> Two-step problems | <input checked="" type="checkbox"/> Equation      | <input type="checkbox"/> Teacher-facilitated    | <input checked="" type="checkbox"/> Centers               |
| <input type="checkbox"/> Multi-step problems          | <input checked="" type="checkbox"/> Solution      | <input checked="" type="checkbox"/> Small group | <input type="checkbox"/> Challenge!                       |

### Thought Extenders

- What operation may be used to solve this problem?
- Which basic model for the strip diagram is needed?
- What are the quantities in the problem?
- What is the total amount?
- What are the parts?
- Where is the answer in the diagram?
- How does the diagram relate to the equation?
- What does the variable stand for?

### Setting Up For Instruction

- Make one copy of **Cruising Along** for each student.
- Make one copy of **Cruising Along Problems** for each pair of students. Cut apart.

### How-To Guide

1. Put students in pairs. You may put students in groups of four, but they should work in pairs. Hand out materials.
2. Explain the task to your students.
  - Read the problem.
  - Fill in the missing pieces of the strip diagrams to match the problem and the equation. Students may have to fill in a number or a label or both.
  - Fill in the missing pieces of the equation to match the problem and the strip diagram. Students may have to fill in a missing number or a label or both.
3. Students should work together to complete the task.

### + Sentence Frames for a Language-Rich Math Classroom (4.1G)

Sentence frames don't have to be complicated! Some sentence frames simply require students to supply missing words; others are more open-ended and serve as a jump start to talking about content more deeply. Instead of spending their brain power on trying to figure out just the right words, English Language Learners and their classmates are freed up to focus on the meaty content of what they are trying to communicate. You can start by considering the Thought Extenders. What kind of academic language is required to answer these? Give it a try, and listen to your English Language Learners succeed!

- I can write the number in expanded form by . . . .
- I found the partial products by . . . .
- When I add \_\_\_\_ and \_\_\_\_, I get the sum of the partial products. The sum is \_\_\_\_.
- The steps for finding the partial products are: 1. \_\_\_\_\_, 2. \_\_\_\_\_, 3. \_\_\_\_\_, etc.
- The standard algorithm is like partial products because both \_\_\_\_\_.
- Another way to solve this problem is . . . .



## CRUISING ALONG PROBLEMS

<p><b>1</b> 2,366 people are on a cruise ship. 28 of them have blue bracelets. 14 of them have yellow bracelets. 7 of them have pink bracelets. The rest of them have no bracelets at all. How many people on the ship do not have bracelets?</p>	<p><b>4</b> After the third stop, the people on the ship divided themselves into 7 different groups of the same size so they could explore 7 different islands. How many people were in each group? (Hint: Use the total number of people from Problem #3 to help you solve the problem.)</p>
<p><b>2</b> Each of the chefs on the ship is in charge of making 28 different kinds of desserts. There are 7 chefs on board the ship. How many different kinds of desserts do the chefs make?</p>	<p><b>5</b> On the fourth day, 28 people from each of the 7 groups decided that they were bored with the cruise and left the ship. How many people were left on the ship? (Hint: Use the total number of people from Problem #3 to help you solve the problem.)</p>
<p><b>3</b> At the first stop of the cruise ship, 15 extra people came aboard and joined the other 2,366 people on the ship. Thirteen more people came aboard at the second stop. At the third stop, 7 more people came aboard. How many people were on the ship after the third stop?</p>	<p><b>6</b> Since so many other people left the cruise, it made some of the 2,205 people left on the ship want to leave too! In the remaining 7 days of the cruise, 14 people left each day. How many people were left on the ship at the end of the cruise?</p>



## CRUISING ALONG PROBLEMS

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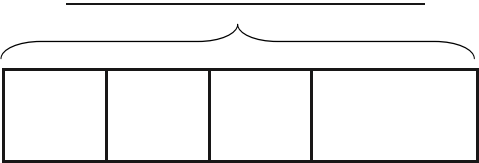
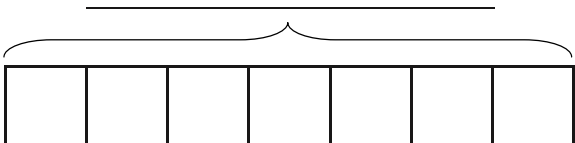
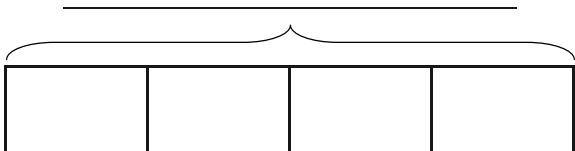
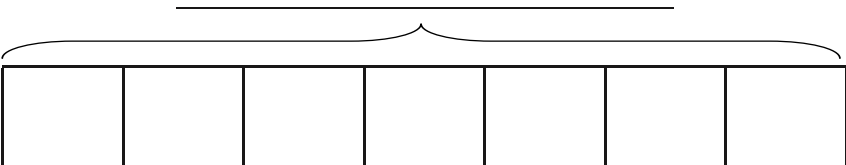
Strip Diagram	Equation and Solution														
<p>1</p> <p style="text-align: center;">2,366</p> <div style="text-align: center;"><table border="1" style="margin: auto;"><tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr><tr><td style="text-align: center;">28</td><td style="text-align: center;">14</td><td style="text-align: center;">7</td><td colspan="2" style="text-align: center;">no bracelets</td></tr></table></div>						28	14	7	no bracelets		$2366 - (28 + 14 + 7) = b$ <p>Solution: <u>2,317 people</u></p>				
28	14	7	no bracelets												
<p>2</p> <p style="text-align: center;">total number of desserts</p> <div style="text-align: center;"><table border="1" style="margin: auto;"><tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr><tr><td style="text-align: center;">28</td><td style="text-align: center;">28</td><td style="text-align: center;">28</td><td style="text-align: center;">28</td><td style="text-align: center;">28</td><td style="text-align: center;">28</td><td style="text-align: center;">28</td></tr></table></div>								28	28	28	28	28	28	28	$28 \times 7 = d$ <p>Solution: <u>196 desserts</u></p>
28	28	28	28	28	28	28									
<p>3</p> <p style="text-align: center;">total number on ship</p> <div style="text-align: center;"><table border="1" style="margin: auto;"><tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr><tr><td style="text-align: center;">2366</td><td style="text-align: center;">15</td><td style="text-align: center;">13</td><td style="text-align: center;">7</td></tr></table></div>					2366	15	13	7	$2366 + 15 + 13 + 7 = t$ <p>Solution: <u>2,401 people</u></p>						
2366	15	13	7												
<p>4</p> <p style="text-align: center;">2,401</p> <div style="text-align: center;"><table border="1" style="margin: auto;"><tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr><tr><td colspan="7" style="text-align: center;">number of people in each group</td></tr></table></div>								number of people in each group							$2401 \div 7 = p$ <p>Solution: <u>343 people</u></p>
number of people in each group															



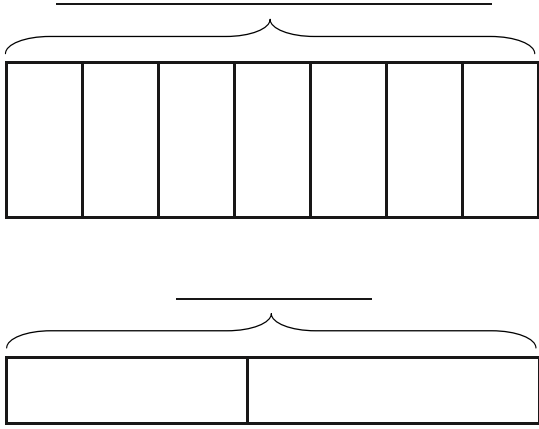
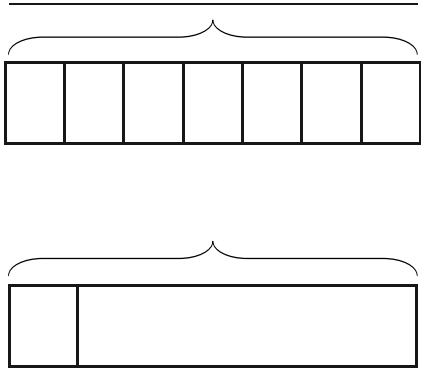
Strip Diagram	Equation and Solution									
<p>5</p> <p>number of people who left</p> <table border="1"><tr><td>28</td><td>28</td><td>28</td><td>28</td><td>28</td><td>28</td><td>28</td></tr></table> <p>2,401</p> <table border="1"><tr><td>196</td><td>number of people on ship</td></tr></table>	28	28	28	28	28	28	28	196	number of people on ship	$28 \times 7 = 196$ $2401 - 196 = p$ <p>Solution: <u>2,205</u> people</p>
28	28	28	28	28	28	28				
196	number of people on ship									
<p>6</p> <p>number of people who left</p> <table border="1"><tr><td>14</td><td>14</td><td>14</td><td>14</td><td>14</td><td>14</td><td>14</td></tr></table> <p>2,205</p> <table border="1"><tr><td>98</td><td>number of people on ship</td></tr></table>	14	14	14	14	14	14	14	98	number of people on ship	$14 \times 7 = 98$ $2205 - 98 = p$ <p>Solution: <u>2,107</u> people</p>
14	14	14	14	14	14	14				
98	number of people on ship									



**Directions:** For each problem, fill in the strip diagram, write the equation, and solve the problem.

Strip Diagram	Equation and Solution
<p>1</p> 	$\underline{\quad} - (\underline{\quad} + \underline{\quad} + \underline{\quad}) = b$ <p>Solution: _____</p>
<p>2</p> 	$\underline{\quad} \times \underline{\quad} = d$ <p>Solution: _____</p>
<p>3</p> 	$\underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} = t$ <p>Solution: _____</p>
<p>4</p> 	$\underline{\quad} \div \underline{\quad} = p$ <p>Solution: _____</p>



Strip Diagram	Equation and Solution
<p><b>5</b></p> 	$\underline{\quad} \times \underline{\quad} = \underline{\quad}$ $\underline{\quad} - \underline{\quad} = p$ Solution: _____
<p><b>6</b></p> 	$\underline{\quad} \times \underline{\quad} = \underline{\quad}$ $\underline{\quad} - \underline{\quad} = p$ Solution: _____