



ADDITION AND SUBTRACTION MODEL MATCHING ACTIVITY

This activity is designed to be used with students as well as educators learning about the various word problem types that involve addition and subtraction. Based on the work of Thomas Carpenter et al. in their book *Children's Mathematics: Cognitively Guided Instruction* on various problem types, there is one word problem for each type and with the unknown in each position.

There is also a sample model for each word problem given with labels for the various parts and a question mark for the unknown. There is a 1-1 matchup for each word problem and model. All the word problems in this activity involve birds and the fact family of 2, 6, and 8 so that there is a focus on the structure of the word problem and the unknown. There are various options when using these cards.

Option 1: Make a pile of word problems and lay out all the models on a table. Students take a word problem and match it with its model. Students must explain their reasoning before a match is made and other students must agree before the two cards are put into the discard pile. Students continue doing this until all the cards are gone.

Option 2: This version of the activity is identical to Option 1 except the pile is made up of the model cards and the word problems are all visible on the table.

Option 3: Students take one model card and write a word problem that matches the situation. Students must then share with a partner and explain their thinking.

Option 4: Students take one word problem card and make a model of the situation. They then must meet with a partner and explain their thinking.

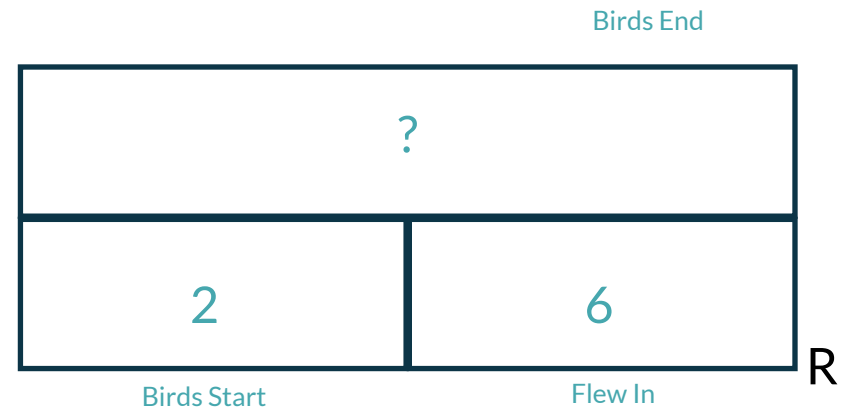
The last few pages of this resource include equations that are possible and not possible to solve the problems. They are not an exhaustive list of all the possible equations that can be used for these problems, but they are meant to generate conversation.

Behind these possibilities of equations are the foundational concepts of the commutative property of addition, the understanding of equality, the inverse relationship between addition and subtraction, and that there is no commutative property of subtraction. These are NOT a 1-1 matchup with the word problems and models. Instead, they are to be used to engage students in a conversation about what possible equations could be used to solve each situation.

We want students to be flexible in their thinking. Even if a problem situation involves finding a difference, students could choose to think additively to arrive at their solution. Thus, the various possible equations that could be used are all the possibilities that students could pick from to arrive at their solutions.

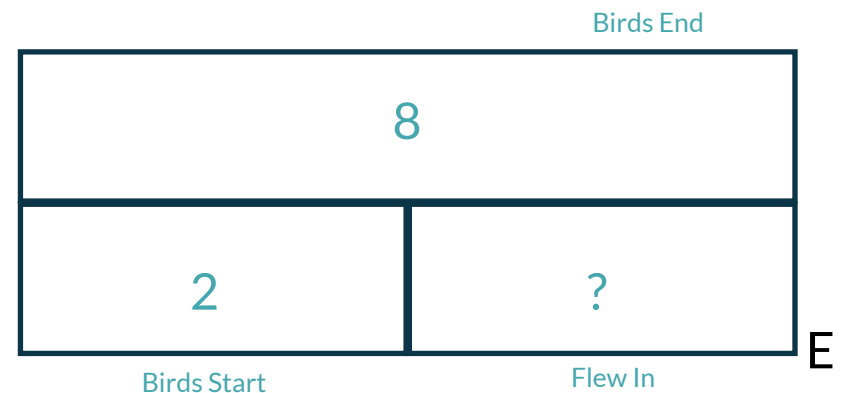
1. There were 2 birds in a tree. 6 more birds flew in to join them. How many birds are in the tree now?

D



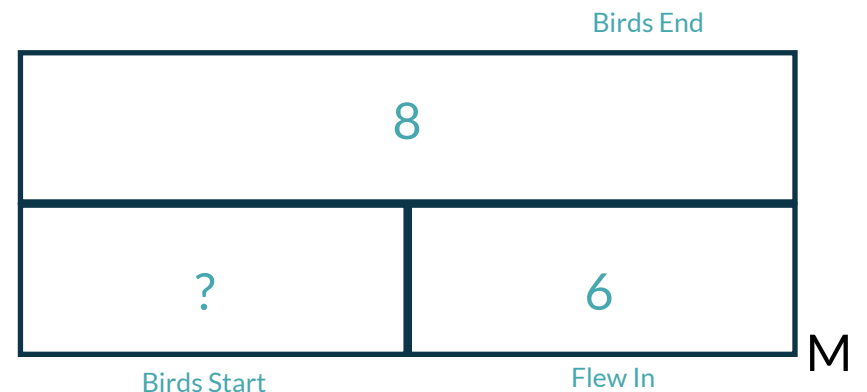
2. There were 2 birds in a tree. Some more flew in to join them. Now there are 8. How many birds flew in?

A



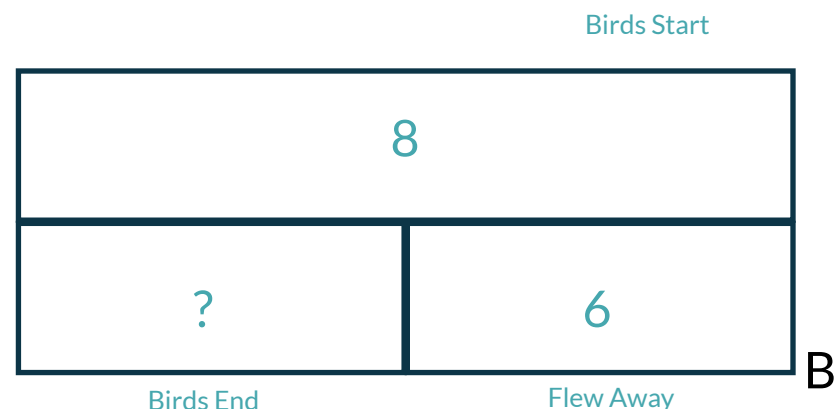
3. There were some birds in a tree. 6 more flew in to join them. Now there are 8 birds in the tree. How many were there at the start?

T



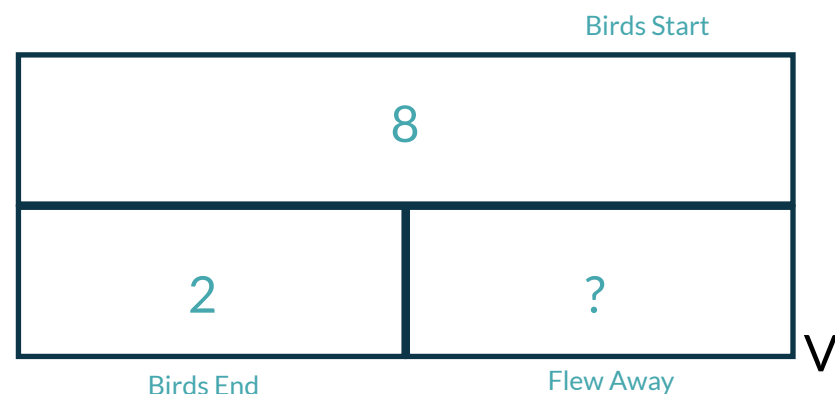
4. There were 8 birds in a tree. 6 flew away. How many birds are left in the tree?

W



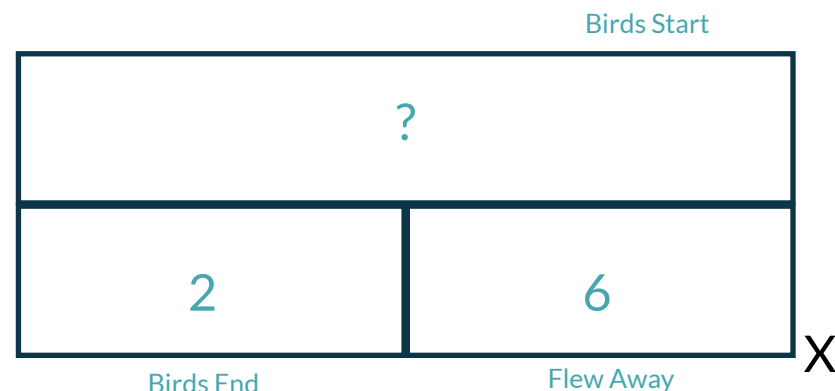
5. There were 8 birds in a tree. Some flew away. Now there are 2 birds in the tree. How many flew away?

K



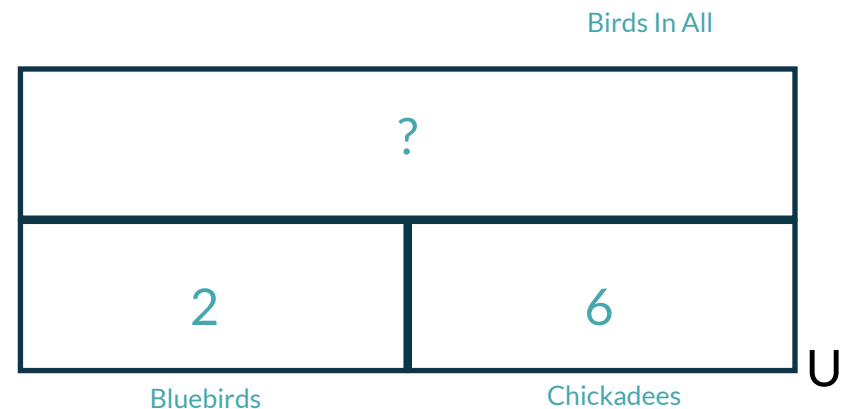
6. There were some birds in a tree. 6 flew away. There are 2 birds in the tree now. How many were in the tree at the start?

J



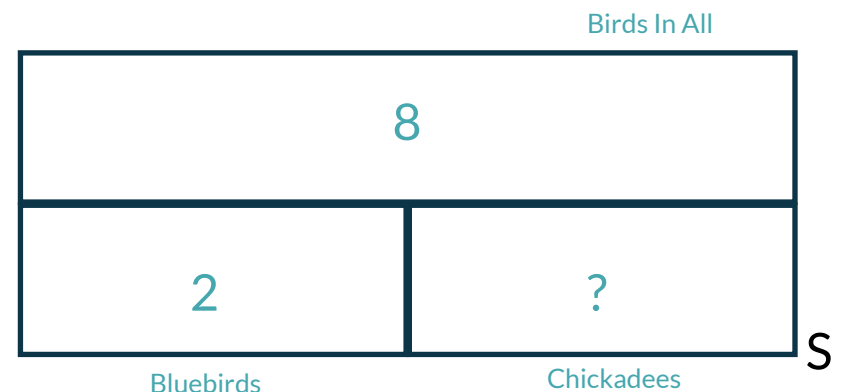
7. There were 2 bluebirds and 6 chickadees in a tree. How many birds were in the tree?

C



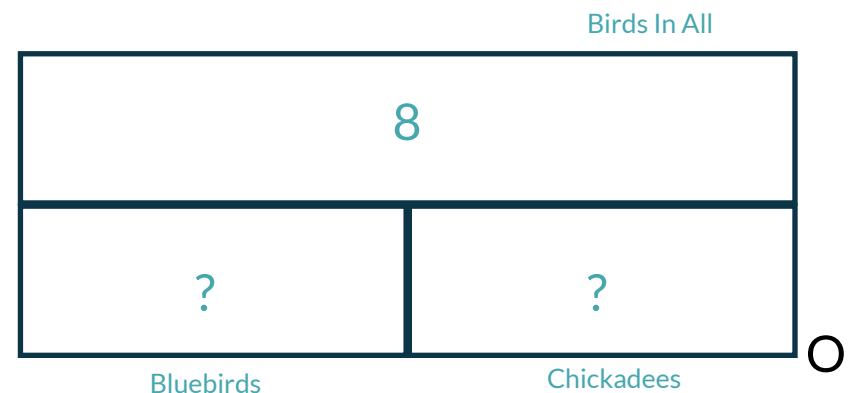
8. There were 2 bluebirds in a tree and the rest were chickadees. If there were 8 birds in all, how many chickadees were there?

L



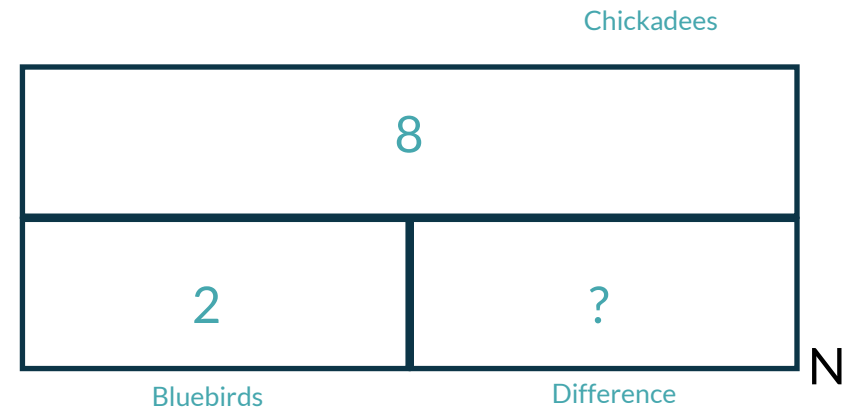
9. There are some bluebirds and chickadees in a tree. What are all the possible combinations of birds in the tree if there were 8 birds in all?

Y



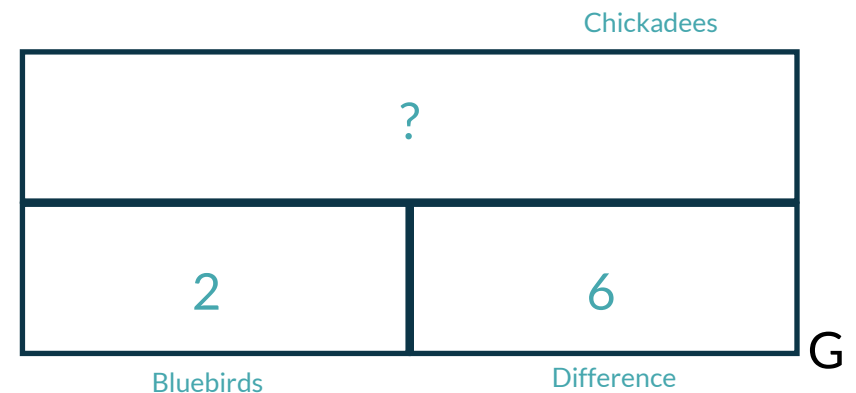
10. There were 2 bluebirds and 8 chickadees in a tree. How many more chickadees were there than bluebirds?

Z



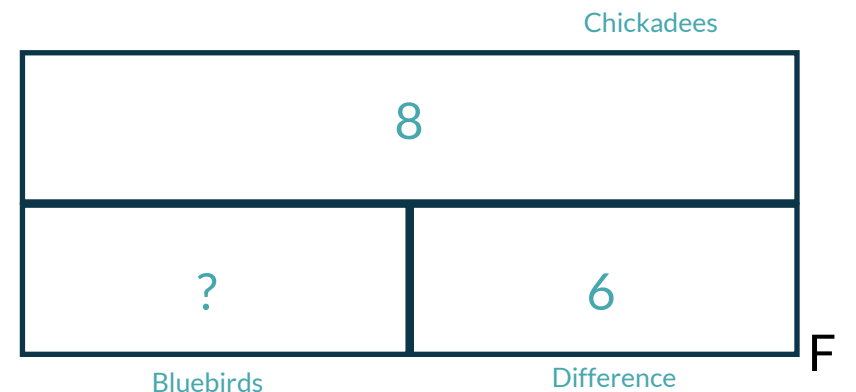
11. There were 2 bluebirds in a tree. If there were 6 more chickadees than bluebirds, how many chickadees were there?

P



12. There were 8 chickadees in a tree. If there were 6 fewer bluebirds than chickadees, how many bluebirds were there?

H



Addition and Subtraction Model Matching Answer Key

1. D, R	$2 + 6 = ?$	$6 + 2 = ?$	$? - 6 = 2$	$? - 2 = 6$
	$? = 2 + 6$	$? = 6 + 2$	$2 = ? - 6$	$6 = ? - 2$
2. A, E	$2 + ? = 8$	$? + 2 = 8$	$8 - 2 = ?$	$8 - ? = 2$
	$8 = 2 + ?$	$8 = ? + 2$	$? = 8 - 2$	$2 = 8 - ?$
3. T, M	$? + 6 = 8$	$6 + ? = 8$	$8 - 6 = ?$	$8 - ? = 2$
	$8 = ? + 6$	$8 = 6 + ?$	$? = 8 - 6$	$2 = 8 - ?$
4. W, B	$? + 6 = 8$	$6 + ? = 8$	$8 - 6 = ?$	$8 - ? = 2$
	$8 = ? + 6$	$8 = 6 + ?$	$? = 8 - 6$	$2 = 8 - ?$
5. K, V	$2 + ? = 8$	$? + 2 = 8$	$8 - 2 = ?$	$8 - ? = 2$
	$8 = 2 + ?$	$8 = ? + 2$	$? = 8 - 2$	$2 = 8 - ?$
6. J, X	$2 + 6 = ?$	$6 + 2 = ?$	$? - 6 = 2$	$? - 2 = 6$
	$? = 2 + 6$	$? = 6 + 2$	$2 = ? - 6$	$6 = ? - 2$
7. C, U	$2 + 6 = ?$	$6 + 2 = ?$	$? - 6 = 2$	$? - 2 = 6$
	$? = 2 + 6$	$? = 6 + 2$	$2 = ? - 6$	$6 = ? - 2$
8. L, S	$2 + ? = 8$	$? + 2 = 8$	$8 - 2 = ?$	$8 - ? = 2$
	$8 = 2 + ?$	$8 = ? + 2$	$? = 8 - 2$	$2 = 8 - ?$

9. Y, O This is a special type in which we expect students to be able to find all the pairs of addends that can result in 8. Since the problem said that there are some bluebirds and chickadees, $8 + 0 = 8$ is not a possibility. It is helpful to use a table to record all the possibilities in a systematic way so that we can ensure we have found all the possibilities.

<u>bluebirds</u>	<u>chickadees</u>		
1	7	$1 + 7 = 8$	$8 = 1 + 7$
2	6	$2 + 6 = 8$	$8 = 2 + 6$
3	5	$3 + 5 = 8$	$8 = 3 + 5$
4	4	$4 + 4 = 8$	$8 = 4 + 4$
5	3	$5 + 3 = 8$	$8 = 3 + 5$
6	2	$6 + 2 = 8$	$8 = 6 + 2$
7	1	$7 + 1 = 8$	$8 = 7 + 1$

10. Z, N	$2 + ? = 8$	$? + 2 = 8$	$8 - 2 = ?$	$8 - ? = 2$
	$8 = 2 + ?$	$8 = ? + 2$	$? = 8 - 2$	$2 = 8 - ?$
11. P, G	$2 + 6 = ?$	$6 + 2 = ?$	$? - 6 = 2$	$? - 2 = 6$
	$? = 2 + 6$	$? = 6 + 2$	$2 = ? - 6$	$6 = ? - 2$
12. H, F	$? + 6 = 8$	$6 + ? = 8$	$8 - 6 = ?$	$8 - ? = 2$
	$8 = ? + 6$	$8 = 6 + ?$	$? = 8 - 6$	$2 = 8 - ?$

Equations included that won't solve any of these situations:

$8 + 6 = ?$	$6 + 8 = ?$	$8 + 2 = ?$	$2 + 8 = ?$	$2 - 6 = ?$
$6 = 2 - ?$	$8 = 2 - ?$	$? = 2 - 8$	$2 - ? = 8$	$2 - 8 = ?$

$2 + 6 = ? \quad 6 + 2 = ?$

$? = 2 + 6 \quad ? = 6 + 2$

$8 = ? + 6 \quad 8 = 2 + ?$

$$? + 6 = 8$$

$$2 + ? = 8$$

$$? + 2 = 8$$

$$6 + ? = 8$$

$$8 - 6 = ?$$

$$8 - 2 = ?$$

$$? = 8 - 6$$

$$? = 8 - 2$$

$$8 + 6 = ?$$

$$6 + 8 = ?$$

$$8 + 2 = ?$$

$$2 + 8 = ?$$

$$2 - 6 = ?$$

$$2 - 8 = ?$$

$$6 = 2 - ?$$

$$8 = 2 - ?$$

$$? = 2 - 8$$

$$2 - ? = 8$$