SESSION 1.8A

Story Problems with Missing Parts

Math Focus Points

- Developing strategies for solving problems with unknown change/start
- Developing strategies for recording solutions to story problems
- Using numbers and standard notation (+, −, =) to record

Today's Plan		Materials
1 ACTIVITY **Story Problems with Missing Parts**	20 MIN, CLASS	• Connecting cubes
2 ACTIVITY **More Story Problems with Missing Parts**	20 MIN, PAIRS, INDIVIDUALS	• *Student Activity Book,* pp. 15A–15B or **C43–C44, Story Problems with Missing Parts** Make copies. (as needed) • Connecting cubes
3 DISCUSSION **Story Problems with Missing Parts**	20 MIN, CLASS	• Students' completed copies of *Student Activity Book* pp. 15A–15B or C43–C44 (from Activity 2) • Connecting cubes
4 SESSION FOLLOW-UP **Daily Practice**		• *Student Activity Book,* p. 15C or **C45, A Story Problem with an Unknown Change** Make copies. (as needed)

Classroom Routines

Morning Meeting: Telling Time to the Half Hour Follow your daily *Morning Meeting* Routine. During *Daily Schedule*, post the time of each event on the classroom schedule using both analog and digital representations. Focusing on activities that start on the hour or half hour, ask students questions about what time different activities happen:

- What's happening at 10:30 this morning? [Literacy]
- What time does [math] start? [9:00]
- What time is dismissal? [2:30]

Review what the analog clock looks like at each of these times. Also, ask students to help you record a few times that aren't on your schedule and set the demonstration clock to those times. We have recess at [12:30] today. How would you write that time? What would my clock look like at that time?

ACTIVITY

1 Story Problems with Missing Parts

20 MIN CLASS

Use the *Story Problem Routine* (Session 1.2, page 37) to introduce a new kind of story, one with a missing or unknown part. ❶ As always, ask students to visualize what happens as you tell the story.

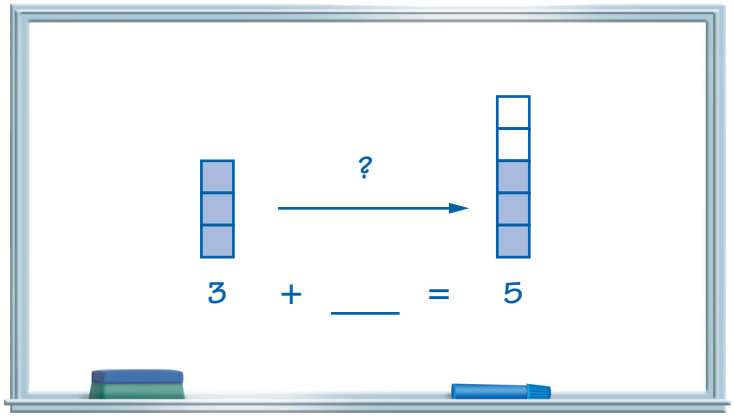
The other day, my daughter was using blocks to build a tower. At first, her tower had 3 blocks. She put some more blocks on the tower. Then, she had 5 blocks in her tower.

Ask several volunteers to retell the story in their own words. When you are satisfied that students can imagine the situation, discuss the problem. Explain that an answer is not needed yet.

What happened in the story? Do we know how many blocks she started out with? *(3)* Then what happened? *(She added some more blocks.)* How many did she have at the end? *(5)* What do you think we need to find out? *(How many blocks she added.)* ❷

As you discuss the problem, model one way to notate it. ❸

You said she started with 3 blocks, so I'm going to write 3 and sketch 3 blocks. Then she got some more, so I'm going to write "+". But [Leah] said we don't know how many, so how should I write that? *(A blank, a box, a question mark)* At the end of the story, my daughter had 5 blocks, including the 3 from the beginning.



The blank stands for the number of blocks she added to her tower. That's what you need to figure out.

Have pairs work together to solve the problem. Connecting cubes should be available. ❹

Ask students to share their strategies. Invite volunteers to use cubes to model the situation, or do so yourself.

Teaching Notes

❶ **Problems with Unknown Change** Many students find these problems challenging because it is difficult to imagine or act out an *unknown* change. The numbers in these stories are purposefully kept small and familiar so that students can focus on what is hard—visualizing the action of the problem.

❷ **What Do We Need to Find Out?** Many students, even those who can accurately retell the story, will say that they need to find "how many blocks in all." They recognize that the problem involves combining two amounts, and in their experience, in order to solve such problems, you need to find a total. Encourage these students to think carefully about the sequence of actions in the problem.

❸ **Notation for Problems with Unknown Change** Choose one way to notate this problem. In other discussions, notate in different ways so that students see a variety of equations: 3 + ____ = 5, 3 + □ = 5, or 3 + ? = 5. Connect this type of problem and notation to the work they've been doing in *Tens Go Fish* (Session 1.6) and *Quick Images: Ten-Frames* (Session 1.7).

❹ **Modeling with Cubes** Some students will build a tower of 3 and then a tower of 5. They may combine those two numbers or be unsure of how to use those towers to get an answer. Using cubes of one color to represent the starting amount can help students focus on the change—how many were added—as can acting out the situation.

Teaching Note

5 Problems with Unknown Starts
Many students find these problems even more challenging than unknown change problems because there is no known place to start. They may say things like, "I know she added 2, but I don't know *to what.*" Help students think carefully about the sequence of actions and how they might model them in a way that helps them solve the problem.

Students might say:

"We looked at your picture. You can see the 2 more cubes."

"We just knew that 3 + 2 is 5."

[Tamika] said she had 3 blocks, so I should take 3 cubes. [Take 3 cubes in one color.] Then, we know she added more. If we add 1 more block, do we have 5? [Add a cube of another color.] [Felipe] says that makes 4. So we're not to 5 yet. What if we add another cube? Will we have 5? [Add another cube in the second color.]

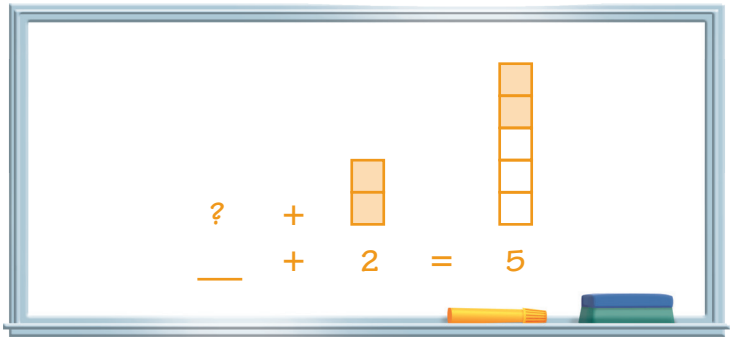
Help students connect the cube tower back to the story.

If we go back to the story, what do the [green] cubes represent? *(The blocks in her tower at the beginning)* What do the [yellow] cubes represent? *(The blocks she added)* What about the whole tower? *(The number of blocks at the end of the story)* So, what's our answer? *(2)*

Review the unknown in the problem. Using the context of familiar games may help (e.g., *Tens Go Fish, Counters in a Cup, How Many Am I Hiding?*). Next, pose another related problem. 5

After my daughter's tower fell over, she started to build another one. She used some blocks to start the new tower. Then she added 2 more blocks. Finally, she counted all of the blocks and told me there were 5 blocks in her tower.

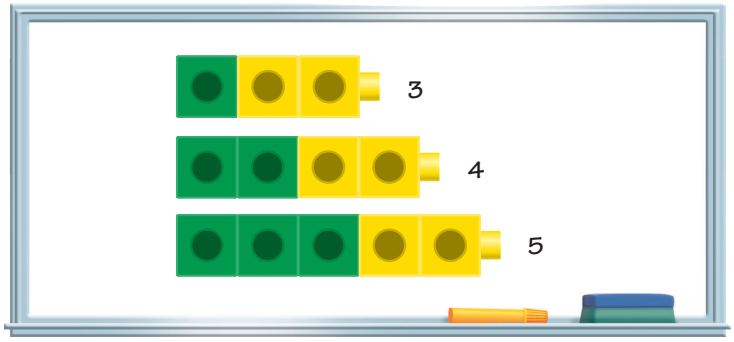
Follow the same process for this problem. Ask several volunteers to retell the story in their own words. Discuss what information is known and unknown. Sketch a picture and model notation for the problem. Review what the problem is asking them to find.



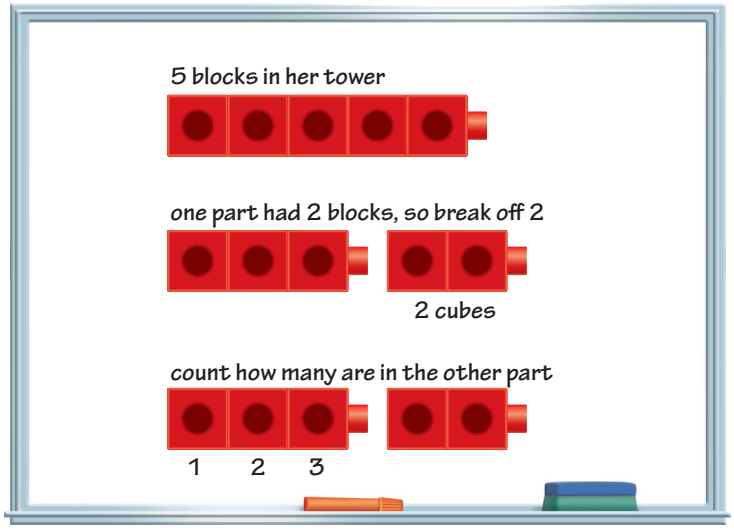
Pairs work together to solve the problem. Then students discuss their strategies, modeling them with cubes whenever possible.

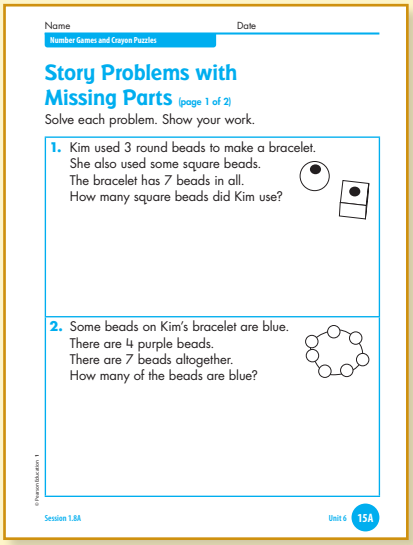
Students might say:

"We thought about what plus 2 equals 5. We tried 1, but 1 + 2 = 3, not 5. So we kept adding 1 and counting to see if it equaled 5. And we found that 3 + 2 = 5."



"She ended with 5, so we took 5 cubes. We knew one part of her tower had 2, so we broke off 2. Then we counted how many were in the other part and it was 3."




Name Date
Number Games and Crayon Puzzles

Story Problems with Missing Parts (page 1 of 2)

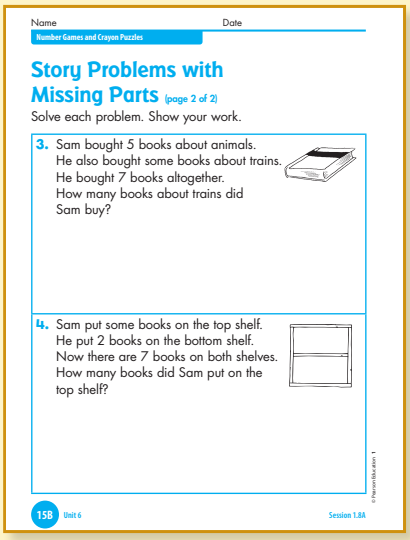
Solve each problem. Show your work.

1. Kim used 3 round beads to make a bracelet. She also used some square beads. The bracelet has 7 beads in all. How many square beads did Kim use?

2. Some beads on Kim's bracelet are blue. There are 4 purple beads. There are 7 beads altogether. How many of the beads are blue?

Session 1.8A Unit 6 15A

▲ **Student Activity Book, Unit 6, p.15A; Resource Masters, C43**


Name Date
Number Games and Crayon Puzzles

Story Problems with Missing Parts (page 2 of 2)

Solve each problem. Show your work.

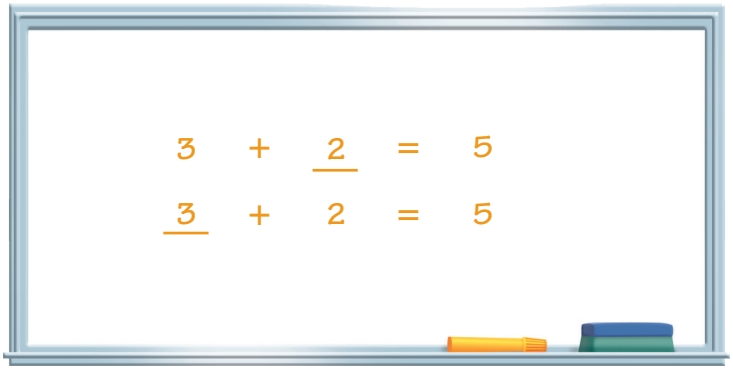
3. Sam bought 5 books about animals. He also bought some books about trains. He bought 7 books altogether. How many books about trains did Sam buy?

4. Sam put some books on the top shelf. He put 2 books on the bottom shelf. Now there are 7 books on both shelves. How many books did Sam put on the top shelf?

15B Unit 6 Session 1.8A

▲ **Student Activity Book, Unit 6, p. 15B; Resource Masters, C44**

"The first problem was 3 plus something equals 5, and the something was 2. Now it's something plus 2 equals 5, so it has to be 3."



2 ACTIVITY

More Story Problems with Missing Parts

20 MIN PAIRS INDIVIDUALS

Students work with a partner or on their own to solve problems similar to those they just solved and discussed. Distribute Story Problems with Missing Parts (*Student Activity Book* pages 15A and 15B or C43 and C44), and explain that, for each problem, they should write an equation, solve the problem, and show their work.

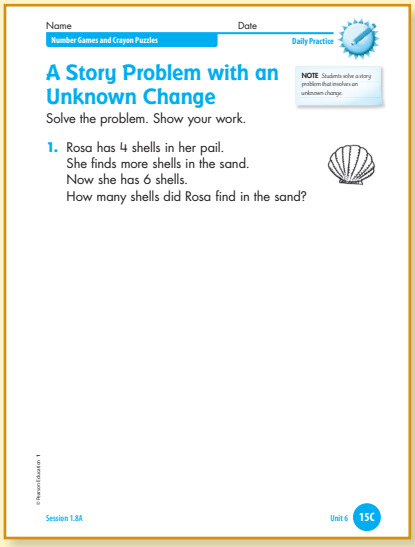
ONGOING ASSESSMENT: Observing Students at Work

Students solve problems that involve combining with an unknown change or an unknown start. Note the variety of solution methods so that different strategies can be discussed at the end of this session.

- **Can students visualize the action in each problem?**
- **What tools and strategies do students use to solve the problems?** Do they model or act out the problem with pictures or cubes? Do they count on or back? Do they use knowledge of number combinations?
- **Can students explain and record their strategies?** Do they use numbers and notation to write an equation that shows the problem and its solution?

DIFFERENTIATION: Supporting the Range of Learners

Intervention Some students have difficulty making sense of problems with an unknown. They may model each number in the problem but then be unsure of how to proceed. They may combine the numbers in the problem, compare the two numbers, or subtract one from the other without really understanding why they are doing so. Work with these students in a small group, asking them to tell the story in their own words, and to act out what is happening. As in Activity 1, write an equation that represents the problem, and work together to model and solve the problem.


Name Date
Number Games and Crayon Puzzles Daily Practice

A Story Problem with an Unknown Change

NOTE Students solve a story problem that involves an unknown change.

Solve the problem. Show your work.

1. Rosa has 4 shells in her pail.
She finds more shells in the sand.
Now she has 6 shells.
How many shells did Rosa find in the sand?

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Session 1.8A Unit 6 15C

▲ Student Activity Book, Unit 6, p. 15C; Resource Masters, C45

3 DISCUSSION

Story Problems with Missing Parts

20 MIN CLASS

Math Focus Points for Discussion

- Developing strategies for solving problems with unknown change/start
- Using numbers and standard notation (+, −, =) to record

Gather students together to discuss the problems in Activity 2, following the same format as Activity 1. Ask them to help you write an equation that represents what each problem is asking. Then discuss students' strategies using cubes, pictures, and notation to model and record solutions.

4 SESSION FOLLOW-UP

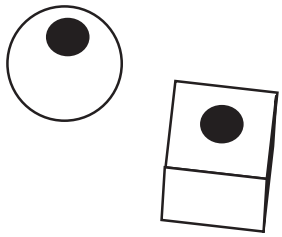
Daily Practice

Daily Practice: For reinforcement of this unit's content, have students complete *Student Activity Book* page 15C or C45.

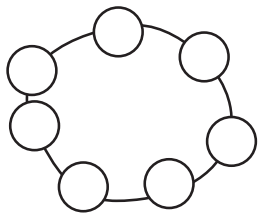
Story Problems with Missing Parts (page 1 of 2)

Solve each problem. Show your work.

1. Kim used 3 round beads to make a bracelet.
She also used some square beads.
The bracelet has 7 beads in all.
How many square beads did Kim use?



2. Some beads on Kim's bracelet are blue.
There are 4 purple beads.
There are 7 beads altogether.
How many of the beads are blue?

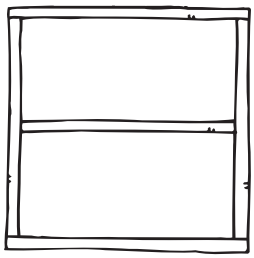


Story Problems with Missing Parts (page 2 of 2)

Solve each problem. Show your work.

3. Sam bought 5 books about animals.
He also bought some books about trains.
He bought 7 books altogether.
How many books about trains did Sam buy?

4. Sam put some books on the top shelf.
He put 2 books on the bottom shelf.
Now there are 7 books on both shelves.
How many books did Sam put on the top shelf?

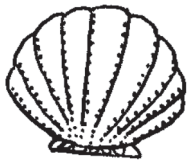


A Story Problem with an Unknown Change

NOTE *Students solve a story problem that involves an unknown change.*

Solve the problem. Show your work.

1. Rosa has 4 shells in her pail.
She finds more shells in the sand.
Now she has 6 shells.
How many shells did Rosa find in the sand?



More Story Problems with Missing Parts (page 1 of 2)

Solve each problem. Show your work.

1. There were 6 birds in a tree.
Some of the birds flew away.
4 birds were left in the tree.
How many birds flew away?

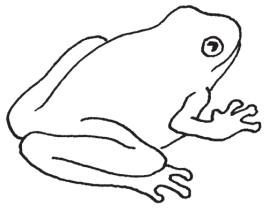
2. Rosa had some stickers.
She gave 2 stickers to her friend.
Then she had 4 stickers left.
How many stickers did Rosa start with?

More Story Problems with Missing Parts (page 2 of 2)

Solve each problem. Show your work.

3. Max had 7 pencils in his desk.
He gave some of the pencils away.
He had 4 pencils left in his desk.
How many pencils did Max give away?

4. There were some frogs in a pond.
3 frogs hopped away.
There were 4 frogs left in the pond.
How many frogs were in the pond at first?



Another Story Problem with an Unknown Change

NOTE *Students solve a story problem that involves an unknown change.*

Solve the problem. Show your work.

1. There were 8 balls in the gym.
Some balls were put away.
There were 5 balls still in the gym.
How many balls were put away?