The MATH LEARNING CENTER

ENGLISH LEARNERS SUCCESS FORUM

Quick-Sketch Story Problems

GRADE 2

Today's Learning

Students solve change unknown story problems. They read, listen to, and retell story problems before representing them with quick sketches and expressions. Partners solve a problem and share their work before going to math stations.

Content Target: I can solve 1-step addition and subtraction story problems. (2.OA.1)

Practice Target: I can talk with others about what math problems mean and show them with numbers, words, and pictures. (MP.2)

Materials

Plinks (chain of 100)
Story Problem Frame Examples 1 & 2 (for display)
Story Problem Frame Example 2 (for students)
Story Problem Frames (for students)

Preparation

Before the warm-up, hang the chain of 100 plinks horizontally near the whole-group area.

Language Opportunities

Word Wall

greater than  8 > 6	less than  5 < 6
REVIEW	REVIEW

Assessment Opportunities

Informally observe as students solve change-unknown story problems. Watch for students to count on by 5s and 10s to solve the problem and to show their work through drawings and numbers. If students count by 1s, encourage them to use 10s and 5s for more efficiency as they solve.

Added Opportunity to Speak

Math Specification 3a

The lesson was revised to include an opportunity for students to retell story problems that they previously were only expected to listen to and read.

New Lesson Objective

Math Guideline 2

The lesson objectives were adjusted to include student talk which sets clear expectations for the use of language and the role of discourse in math learning. The new Math Practice target shows that "abstract and quantitative reasoning" is not necessarily a solitary practice but can occur and be deepened through discussion.

Story Problem Frames

Math Guideline 3

A routine tool for when students encounter story problems was amended to include opportunities for students to use language to learn and demonstrate learning of mathematics. This new frame helps students get in the habit of justifying their solution methods and explaining their interpretations. The sample response starters serve as models of useful mathematics language for the students.

During the Work Time, observe students as they:

Make sense of the problem	Observe for evidence of students' ability to: • Restate the problem with their own words or in a new context, • Describe the known and unknown information, • Act out the problem physically or with manipulatives, • Draw pictures/sketches, and/or write expressions.
Reason informally	Observe for evidence of students' ability to: • Enact a viable solution path, • Apply operations to solve, • Symbolically represent the relationship between quantities, • Count on by 5s and 10s to solve the problem • Produce the correct answer.

Formative Assessment Guidance

Math Guideline 15

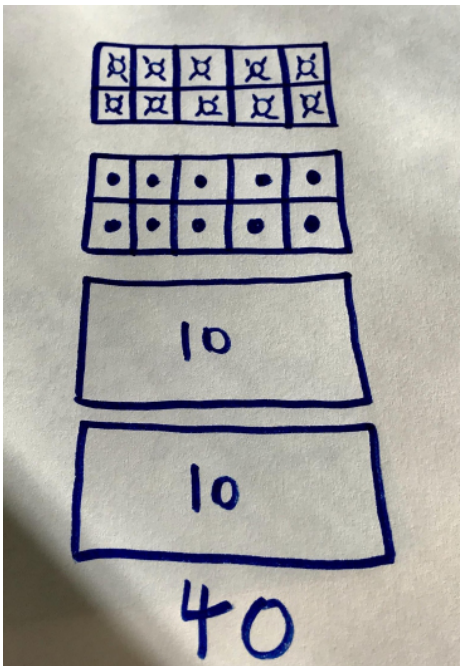
This table of look-and-listen-fors helps elevate the kinds of evidence teachers might gather, through language, that will help teachers understand students' thinking in order to make decisions about what to do next.

Warm-Up: How Many 5s Can We Make?

1. Draw students' attention to the chain of 100 **plinks** and pair-share: *What do you notice?* (There are a lot of plinks; there are still 100). *How many groups of 10 are in the chain?* (10 groups)
2. Chorally count to confirm there are 10 groups of 10.
3. Propose taking the chain apart and reconfiguring it so all the links appear in alternate groups of 5. Ask: *Will there still be 100 plinks? Why or why not?*
    a. Pair-share: *How many groups of 5 will it be possible to make?*
    b. Record students' responses on the board.
4. Detach the first 2 groups of 10 from the chain. Choose two students to reconfigure the 2 tens into groups of 5 in alternating colors.
    a. Ask: *How many groups are there?* (4 groups)
    b. Invite students to revise their answers based on the information.
5. Invite students to continue reconfiguring chains of 10 into 2 sets of 5.
6. Chorally count to confirm there are 20 groups of 5. Count by 5s to confirm the total.

Work Time: Solving Change Unknown Story Problems

1. Introduce today's lesson.
   a. Read both learning targets aloud: *I can solve 1-step addition and subtraction story problems*; *I can talk with others about what math problems mean and show them with numbers, words, and pictures.*
   b. Tell students they will discuss story problems and solve them using quick sketches, numbers, and words.
2. Display **Story Problem Frame Example 1** (p. 6, below) and read the problem aloud. Invite students to retell the story to a partner.
   a. *There were 40 beetles together at a party. Some more beetles join them later. Now there are 65 beetles at the party. How many beetles came later?*
3. Point out that 40 beetles were at a party. In a separate space on the board, briefly model increasingly efficient quick sketches to represent groups of 10.



Increasingly efficient quick sketches to show 40

   a. Remind students that beetles like to organize themselves into groups of 10. Dramatize the laborious nature of drawing the individual beetles in a ten-frame.
   b. Propose a more efficient drawing: draw another 10-frame, this time drawing a single dot to represent each beetle.
   c. Propose an even more efficient quick sketch: Draw a rectangle and label it "10."
   d. Draw 1 more box, totaling 40 in all.
   e. Chorally count by 10s to confirm there are 40 beetles represented.

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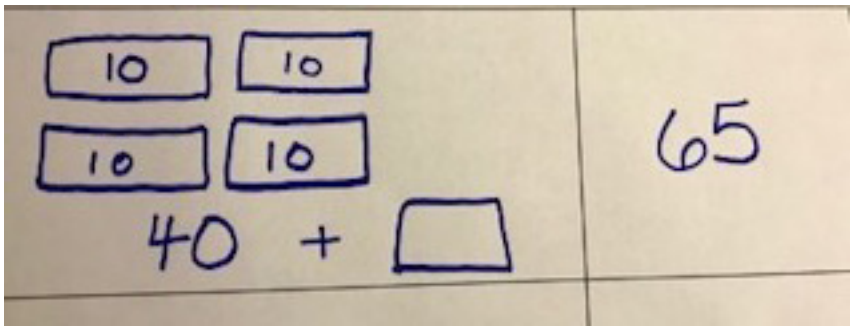
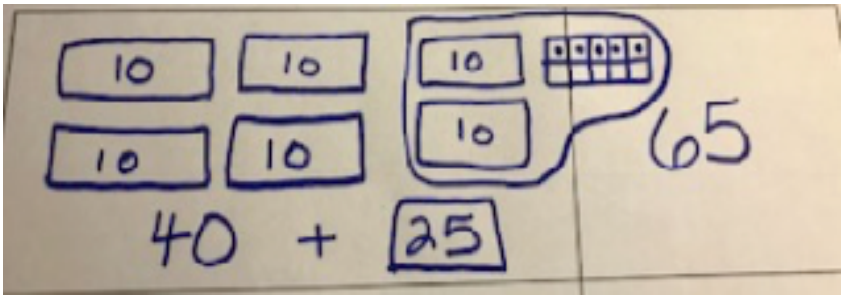
4. Reveal and invite students to read the Questions & Responses aloud.
   a. Display the **math language card for *change*** and review the meaning of change (to make different in some way) by briefly soliciting examples from students of things that change (e.g., babies change as they grow; people change their clothes/ hairstyle; trees change with the seasons).
   b. Review the meaning of ***result*** by referring to the **math language card** and sharing synonyms (answer; solution; outcome).
   c. Review the meaning of ***unknown*** by referring to the **math language card** and sharing a simple definition (the part of the problem we're trying to figure out; the part we don't know).
5. Work through Story Problem Frame Example 1, using the questions and responses as a guide to make sense of the problem.

   Questions:
   - What happened at the beginning?
   - What happened next? What changed?
   - What was the result?
   - What part of the problem is unknown? What did we have to figure out?



   a. Have students retell the story to a partner.
   b. Invite students to ask you each question.
   c. In response, model thinking aloud.



Short problem frame showing students counting by 10s and 5s

   d. Write the equation in the space at the bottom of the Story Problem Frame. (40 + 25 = 65)

Anticipating Language Demands

Math Guideline 6

These instructions help teachers quickly address any potential obstacles students may face in engaging with the mathematical content because of unfamiliar words.

6. Display **Story Problem Frame Example 2** and distribute copies of the printmaster to students. Invite them to work with a partner to make sense of the problem and use the questions and responses to fill in the frame.
7. Prompt students to solve. Circulate and identify 3–4 pairs of students using different strategies to share their work with the class.
    a. Include examples of work from students with limited English proficiency, and support them in describing their strategies to the class.
    b. If possible, include a student who counted on by 5s and 10s.
8. Invite 3–4 pairs of students to share their work and explain how they solved the problem. Document student strategies on the board as students verbalize their solutions.
9. Invite students to compare the strategies, focusing on their efficiency.
    a. Pair-share: *What is similar about these strategies? What is different?* (Responses will vary.)
    b. Review the meaning of *efficient* and provide a sentence starter as needed. (_____ is an efficient strategy because _____.)
    c. Pair-share: *What is efficient about these strategies?* (Responses will vary.)
10. Direct students to find the **Story Problem Frames, Unit 1 Set A** pages in their student books and to spend about 10 minutes solving the problems alone or with a partner before going to math stations.

Reminder to Include Diverse Examples

Math Guideline 11

This is a brief reminder that interesting mathematical ideas come in all kinds of language.

Comparing Strategies

Math Guideline 4

This activity allows students to reflect on mathematical content by using language to make comparisons across different representations and strategies.

Math Choice Time

Invite students to spend 15 minutes at math stations of their choice before following your established cleanup routine.

Closing

1. Review today's mathematical practice learning target: *I can talk with others about what math problems mean and show them with numbers, words, and pictures.*
    a. Pair-share: *How did you meet this learning target through today's work?* (Read the problem out loud; talked to my partner about how to solve the problem; used the question and response prompts to help me think of what to say.)
2. Preview tomorrow's work: continuing to solve story problems using numbers, pictures, and words!

Reflection on Talk

Math Specification 3b

This prompts students to consider the ways in which they explained their mathematical ideas as well as the ideas themselves.

Story Problem Frames Example 1

There were 40 beetles together at a party. Later, some more beetles joined them. Now there are 65 beetles at the party. How many beetles came later?

_____	+ or -	_____	=	_____
Beginning		Change		Result

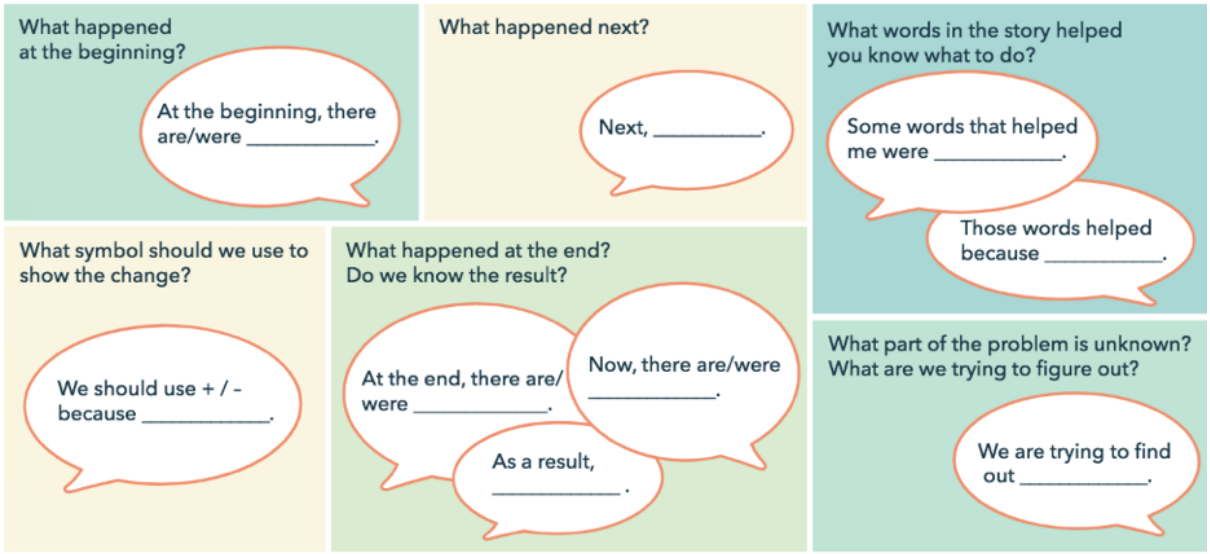
Story Problem Frames Example 2

60 beetles are together in the grass. Some beetles leave the group. Now there are only 35 beetles in the grass. How many beetles left the group?

_____	+ or -	_____	=	_____
Beginning		Change		Result

NAME | DATE

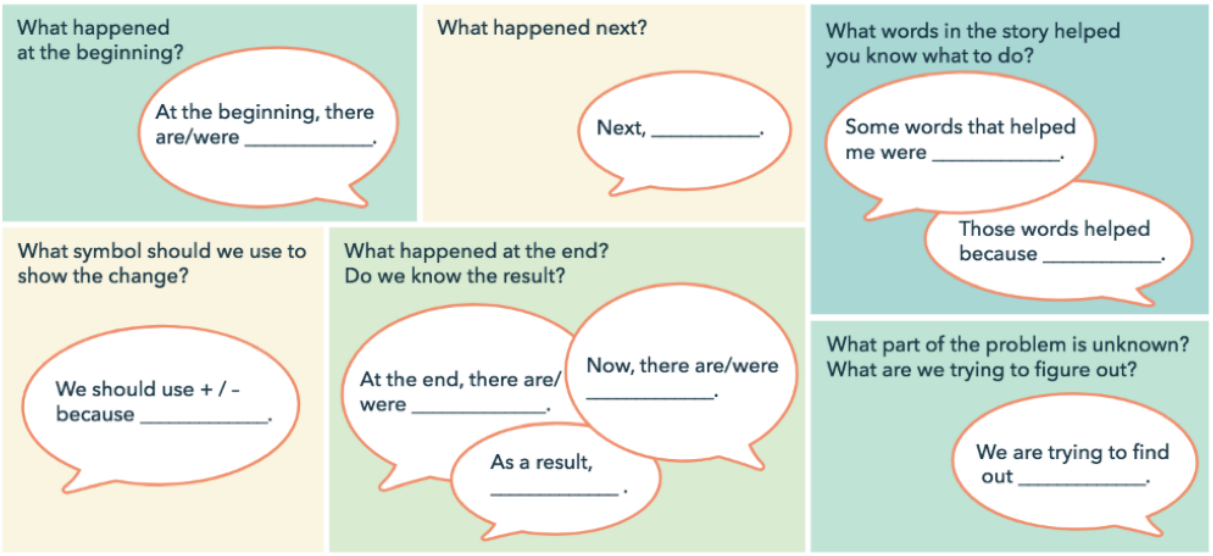
Story Problem Frames



1. There were 85 beetles taking a trip together. Some of the beetles went home. That left 60 beetles still on the trip. How many beetles went home?

_____	+ or –	_____	=	_____
Beginning		Change		Result

Story Problem Frames



2. There are 20 beetles working together. Some more beetles come to help them. Now there are 70 beetles. How many beetles came to help?

_____	+ or –	_____	=	_____
Beginning		Change		Result