Adding and Subtracting to Find a Mystery Number

Teacher Guide

Duration: 30–45 minutes

Standards for Mathematics

MA.K.3.C
Explain the strategies used to solved problems involving adding and subtracting within 10 using spoken words, concreted and pictorial models, and number sentences.

MA.1.3.F
Generate and solve problem situations when given a number sentence involving addition or subtraction of numbers within 20.

Focus Strategies

Thumbs Up: Teacher can quickly check for understanding using this strategy. Students hold Thumbs Up for agreement and thumbs down for disagreement to a question asked by the teacher. Thumbs Up can also be used as a way for students to signal to a teacher that they are ready for an instruction.

Shoulder Partners: Students lean and talk quietly with the person sitting next to them. Shoulder Partner can be used literally to just talk to the people sitting on either side, or for slightly larger groups of 3-4 with everyone's shoulders "touching" (this promotes the ability to speak softly—in sort of a huddle).

Learning Outcomes

- Add and subtract on a number line to find a mystery number
- Apply strategies to subtract within 10.

Key Vocabulary

- Double check
- Less than
- Strategy
- Subtraction
- Visualization
- Visualize

Materials

- 0 to 10 Game Cards (1 per student, pair, or group) (See Activity #6)
- Number Line 0–10 (1 per student) (See the activity Addition Strategies Practice)
- Sets of 10–15 counters (1 set per student, pair, or group)
- Paper

Activity Preparation

- No additional preparation needed.

***TEACHER SAY**: Today we are going to practice our visualization and drawing strategies with subtraction problems. Subtraction is the math word used to describe when we take a certain amount away from another number. In a subtraction problem, our answer will be less than the biggest number we started with. The best way to understand subtracting is to practice. Please close your eyes and get ready to visualize, or see in your mind, this subtraction story.*

STUDENTS DO: Close their eyes.

***TEACHER SAY**: Georgia's mother bought 10 strawberries at the market. Can you picture her mother at the market? You can see all of the pretty strawberries. Her mother is choosing the 10 best to take home to Georgia. Georgia loves strawberries. When her mother brought them home, Georgia ate 3 strawberries. How many strawberries are left? Picture it in your mind. Please open your eyes.*

TEACHER DO: Repeat the subtraction story, if necessary.

STUDENTS DO: Practice visualization strategy, listen to subtraction story, and open their eyes.

***TEACHER SAY**: Think: If Georgia had 10 strawberries and ate 3, will the number left be greater than 10? Or, will the number left be less than 10? If you think the number will be greater than 10, give me a Thumbs Up.*

STUDENTS DO: Give a Thumbs Up if they think the number will be greater than 10.

***TEACHER SAY**: If you think the number will be less than 10, please put a Thumb Up.*

STUDENTS DO: Put a Thumb Up if they think the number will be less than 10.

***TEACHER SAY**: Let's practice this problem on our fingers. Georgia had 10 strawberries. Can you hold up 10 fingers?*

STUDENTS DO: Hold up 10 fingers.

***TEACHER SAY**: Then she ate 3 of them. What do you think we could do with your fingers to show that she ate 3 of them? Whisper to your Shoulder Partner how you could show with your fingers that she had 10 strawberries and then ate 3 of them.*

STUDENTS DO: Talk to their partners.

***TEACHER SAY**: What are some of your ideas? Please raise your hand and share them with the class.*

STUDENTS DO: Raise their hands to volunteer.

TEACHER DO: Call on several students to share their thinking. They may pretend to eat 3 of their fingers or suggest putting 3 fingers down. If neither of these ideas are suggested, show the class how they can count 3 of their 10 fingers and then put them down. Allow time for students to practice this by counting on their partner's fingers.

STUDENTS DO: Selected students explain their strategies.
TEACHER SAY: *Using your fingers to help you count is another good strategy. Now, I will hand out some paper and we can practice drawing this problem.*
TEACHER DO: Distribute paper to students.
TEACHER SAY: *First, we need to draw the 10 strawberries that Georgia's mother bought. Can you draw the 10 strawberries on your page? Remember, in math our drawings are quick and do not need to be perfect. You could use a circle or triangle to draw strawberries.*
STUDENTS DO: Draw 10 strawberries in their math journals.
TEACHER DO: Walk around and see if they can draw 10 strawberries.
TEACHER SAY: *Remember, good mathematicians, people who do math like you, always double check their work. After you draw 10 strawberries, double check by recounting them.*
STUDENTS DO: Recount the strawberries they drew in their math journals.
TEACHER SAY: *Wonderful. Now, Georgia ate 3 of those strawberries. How can you show in your drawing that she ate 3 of them? What could you do? Can you show me in your math journal?*
STUDENTS DO: Find a way to communicate in their drawing that 3 of the 10 strawberries were eaten.
TEACHER DO: Walk around and see how students are showing 10 minus 3. They may be erasing the strawberries that she eats, circling them, or crossing them out.
TEACHER SAY: *How did you show in your drawing that she ate 3 of the 10 strawberries? Can someone raise their hand and bring their math journal to the front of the room, so we can share it with the class*?
STUDENTS DO: Raise their hands to share.
TEACHER DO: Call on a student to share. Recreate their drawings on the board as they explain their thinking (or have the student recreate the drawing on the board). Ask if anyone solved the problem in a different way in their drawing. If so, have them share their thinking and draw it for the class.
STUDENTS DO: Selected students explain their strategies and share their drawings.
TEACHER SAY: *Wonderful. Now remember, the question was: How many strawberries were left? Use your drawing and see if you can figure out how many of the strawberries were left. When you have an answer, please write it on your page.*
STUDENTS DO: Work on solving the problem and write the number 7 on their pages.

***TEACHER SAY**: How did you solve the problem? Who can raise their hand and share their thinking with the class?*
STUDENTS DO: Raise their hands.
TEACHER DO: Call on students to explain their thinking. Use the drawing that is on the board to demonstrate how to count the remaining strawberries.
STUDENTS DO: Selected students explain their strategies and thinking process.
***TEACHER SAY**: Wonderful work using the problem-solving strategy of drawing pictures. Today we are going to play our Math Is Fun game. We will practice subtraction, or taking numbers away, as we did earlier but without the number lines. First, I will hand out your tools. Today we will be using counters and game cards.*
TEACHER DO: Hand out counters, keeping one set to model.
***TEACHER SAY**: We will practice first. If I say 2 less than 5, you will first count out 5 counters. Remember to touch each counter as you say the number and move it into a separate pile.*
TEACHER DO: Count out 5 counters. Touch each one as you say its name and move it into a separate pile.
***TEACHER SAY**: 1, 2, 3, 4, 5. Now I have a group of 5 counters. My problem says 2 less than 5. Do I need to put two more into my group, or do I need to take two away? Tell your Shoulder Partner what you think.*
STUDENTS DO: Talk to their partners.
***TEACHER SAY**: If you think I need to add 2 more counters, please touch your head. If you think I need to take 2 away, please touch your nose.*
STUDENTS DO: Respond to the question.
***TEACHER SAY**: Since my problem says 2 less than 5, I will take 2 away. The word less is a clue that I need to take away. Now I will remove two counters from my pile of 5.*
TEACHER DO: Remove 2.
***TEACHER SAY**: My final step is to count the ones I have remaining to see what is 2 less than 5.*
TEACHER DO: Count the 3 remaining. Touch each counter as it is counted.
***TEACHER SAY**: I am left with 3 counters. Now it is your turn to practice. If my problem says I have 2 less than 6, what would you do first?*
TEACHER DO: Walk students through the problem. First, have them create the number and then remove the corresponding amount.
Note to the Teacher: If this is challenging for the students, slow down and practice it several times. If they understand, move on to the game more quickly.

***TEACHER SAY**: Now we are ready to play the Math Is Fun game. In our last class, we added when we played the game in a new way. Today, we will play with subtraction. It will be just like in our last class, but we will be talking about subtraction.*

TEACHER DO: Hand out the game cards and review how to play. Teacher says a problem, students use beans to solve, and the corresponding number on the game board is covered. Remember to go over rows, columns, and moving diagonally. Remind students that they need 5 in a row to win. When they have 5 in a row, they will call out, "Math is fun."

***TEACHER SAY**: Are we all ready to play?*

TEACHER DO: Play game as done in the activity Subtracting to Find a Mystery Number, beginning with the following questions and then creating more until a student has five in a row:

- 1 less than 10
- 2 less than 5
- 2 less than 8
- 3 less than 5
- 1 less than 1

STUDENTS DO: Use their counters to figure out the number and also to mark it on their game boards.

TEACHER DO: Continue playing the game for multiple rounds.

***TEACHER SAY**: You all have worked so hard today on subtraction. I will use the Calling Sticks to pick two student volunteers. The first will collect the counters and the second will collect the game boards.*

TEACHER DO: Call on two student helpers.

***TEACHER SAY**: Today I would like you use your fingers to answer the questions I am going to give you. Please hold up your fingers when you know the answer. What is 1 less than 4? Please hold up the number on your fingers.*

STUDENTS DO: Hold up 3 fingers.

***TEACHER SAY**: What is 2 less than 8? You will need 2 hands for this problem.*

STUDENTS DO: Hold up 6 fingers.

Note to the Teacher: This exercise is a great informal assessment of students' understanding. Watch how they think about the problems. Look to see if they are using their fingers as tools to help them.

***TEACHER SAY**: Great work today learning about subtraction, or taking away numbers.*

0 to 10 Game Card

0	2	5	1	3
7	6	7	3	4
9	8	1	3	6
8	10	5	9	2
10	0	8	5	4