

# Pick a Problem

Grade 2

Activity # 214

Relevant Chapters in the *Digi-Block Comprehensive Teacher's Guides*:

Book II: 3-5, Separating Groups of Single Blocks, pp.76-79

Book III: 2-4, Subtracting with the Number Line, pp.59 - 61

## Overview

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Students model problems that involve comparing two quantities by counting up or subtracting. They choose two problems to solve from a set of take-away and comparison situations. They create and present a poster that shows their solution in pictures, words, and/or numbers.

## Objectives

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**Thinking Skills:** Students develop strategies to solve comparison subtraction problems.

**Mastery Skills:** Students learn to model subtraction situations and represent their thinking with blocks, pictures, words, and numbers.

## Materials

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Each pair of students needs:

- Scissors
- Glue

- Access to blocks-of-10, small holders, singles, number lines, and place value mats
- "Poster" paper - blank newsprint or paper
- Crayons, markers
- 1 "Pick a Problem" sheet

### Class Introduction

(15 minutes)

**Teacher Note:** Many students have difficulty interpreting comparison problems and truly understanding their meaning. Many are taught to look for key words, such as "more than" or "less than" that cue them to subtract, yet when asked, students are not able to justify why. This is totally understandable, given their more common experiences of take-away subtraction in which something is removed from a set. It is more natural for students to model comparison situations by creating two number lines and counting up to find the difference. Students must be given ample practice in modeling comparison problems in order to believe that the difference between two numbers can be obtained by counting up **or** by subtracting. This lesson exposes students to both ways of comparing, and students should be encouraged to do what **makes sense** to them.

Display the problem:

**Sarah has 18 blocks. Julia has 12 blocks. How many more blocks does Sarah have than Julia?**

(Note: Use students' names whenever possible in story problems to add a real-life connection.)

- Have students think about the problem independently. Explain that they can use the blocks, number lines, draw pictures, or write words and numbers to solve the problem. Encourage as many different ideas as possible. Early finishers can show a second way to solve the problem to verify their solution.
- As a whole class, share strategies for solving the problem.
- After a "way" is shared ask, **Did anyone else solve the problem the same way as \_\_\_\_\_?** This gives the teacher and students a chance to recognize everyone's thinking.

- Depending on the student's strategy, display the blocks or materials he or she used, or have the student draw or write on the board to show his/her thinking.
- Next ask, **Who solved it in a different way?** Display the collection of "ways" to solve the problem, emphasizing that mathematicians often check their thinking by using different strategies to solve the same problem. Students may describe counting up ideas, such as:
  - Place 18 blocks on a number line and 12 on a second. Move the lines side by side and count the 6 blocks that show the difference.
  - Count up from 12, drawing tally marks for each number up to 18.
  - Locate 12 and 18 on the number line and count the spaces between them
  - Draw a picture of both sets of blocks, match them 1 to 1, then count the "extras."

If no student has used subtraction to solve the problem, say, **My friend, Betsy, solved the problem with this number sentence:**

$$18 - 12 = 6$$

**What do you suppose she was thinking?**

- Refer to the models the students have already presented, and help them connect the subtraction strategy with their counting up ideas.
- For example, show the two quantities on two separate number lines and remind students how they counted up to find how many more. Next, lay the 12 blocks on top of the 18, then separate the "12 on 12," leaving the 6 blocks. By removing the blocks that both sets have in common, students may better understand why and how subtraction can be used in this context.

Present a more challenging problem, if students are ready, such as:

**Pedro has 57 blocks. Mariana has 32. How many more blocks does Mariana need so she has the same number as Pedro?**

- Students may compare single lines of blocks, as before, or they may use packed blocks, matching blocks-of-10 and single blocks, and then naming the difference as 2 blocks-of-10 and 5 ones, or 25.
- Observe students to see if any use subtraction or ask, **How do you think Betsy would solve the problem?**

Finally, present the following two story problems that requires regrouping:

**Deshawn has 26 blocks. Tom has 43 blocks.  
How many more blocks does Tom have than  
Deshawn?**

**Miriam has 43 blocks. She gave 26 to  
Beth. How many blocks does Miriam have  
now?**

Contrast it with the comparison problem above by noting that the numbers and answers are the same, but the action may be different. Explain to students that the problems that they will be solving next include both situations.

### Activity

(20 minutes)

Give students the "Pick A Problem" Activity Sheet. Read through all five problems together. Explain that the students need to pick only 2 of the problems to solve. For each problem, they will need to show their solution strategy with blocks, pictures, words, and numbers.

- Have students cut out their first problem and glue it to "Poster" paper - blank newsprint or paper.
- Next, have them model the problem with materials.
- Have them represent what they did with pictures and words on their poster, then finally -
- Express what they did with numbers.

NOTE: If necessary, adjust the numbers in the problems to accommodate students' levels.

Give students ample time to complete the task. It may be a good idea to have students focus on only one problem, saving the second for the next class period. In this way, students will be encouraged to do a thorough job and not feel rushed to move on.

- Be sure students understand the importance of communicating what they are thinking and what they have done as they solve their problem.

- Have students solve the same problem a second (and even third!) way to check their answers. Students enjoy proving that they are right again and again and again!

## Closure

(20 - 30 minutes)

Focus on one problem at a time and have those students who chose it share their solutions. Provide time for students to question one another's thinking and discuss different strategies.

- Posters will reflect the range of abilities within a class. Through students' presentations and questions of their classmates, they will learn from one another.
- Pay special attention to how the students record their thinking with numbers. Be sure to ask students, **What does this number show? What does this sign mean?** This will help them connect what they did with materials to how they record the process.

## Assessment

As students are working, observe and note:

Do they -

- Recognize take-away and comparison situations and model them accordingly?
- Count up or subtract to compare?
- Rely more on the number line or packed blocks to show subtraction?
- Begin with, then take away the correct number of blocks, unpacking a block-of-10 when needed?
- Find the answer?
- Communicate their solutions clearly using blocks, pictures, words, and/or numbers?

Use the answers to the questions above to guide in planning follow-up work and small group instruction.

## Extension

- Give the class a subtraction problem (23 - 14) and have students write a story problem that can be solved with the number sentence. Encourage both take-away and comparison situations.

# Pick A Problem

**Directions:**

1. Choose a problem to solve.
2. Cut it out and paste it on paper.
3. Solve the problem with blocks.
4. Show how you solved it with pictures, words, and numbers.
5. Explain what you did to your classmates.
6. Pick a second problem, and repeat #2 – 5.

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A. Kailey had 74 blocks. She gave 32 to her friend. How many blocks does Kailey have now?

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B. Todd has 34 blocks. Sarah has 15. How many more blocks does Todd have than Sarah?

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C. Margo had 62 mints in her bag. She gave 17 mints to her friends. How many mints are in her bag now?

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D. Maddie has 56 coins. Will has 34 coins. How many more coins does Maddie have than Will?

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E. Veronica has 82 stickers in her book. Sammy has 35 stickers in his book. How many more stickers are in Veronica's book than Sammy's?