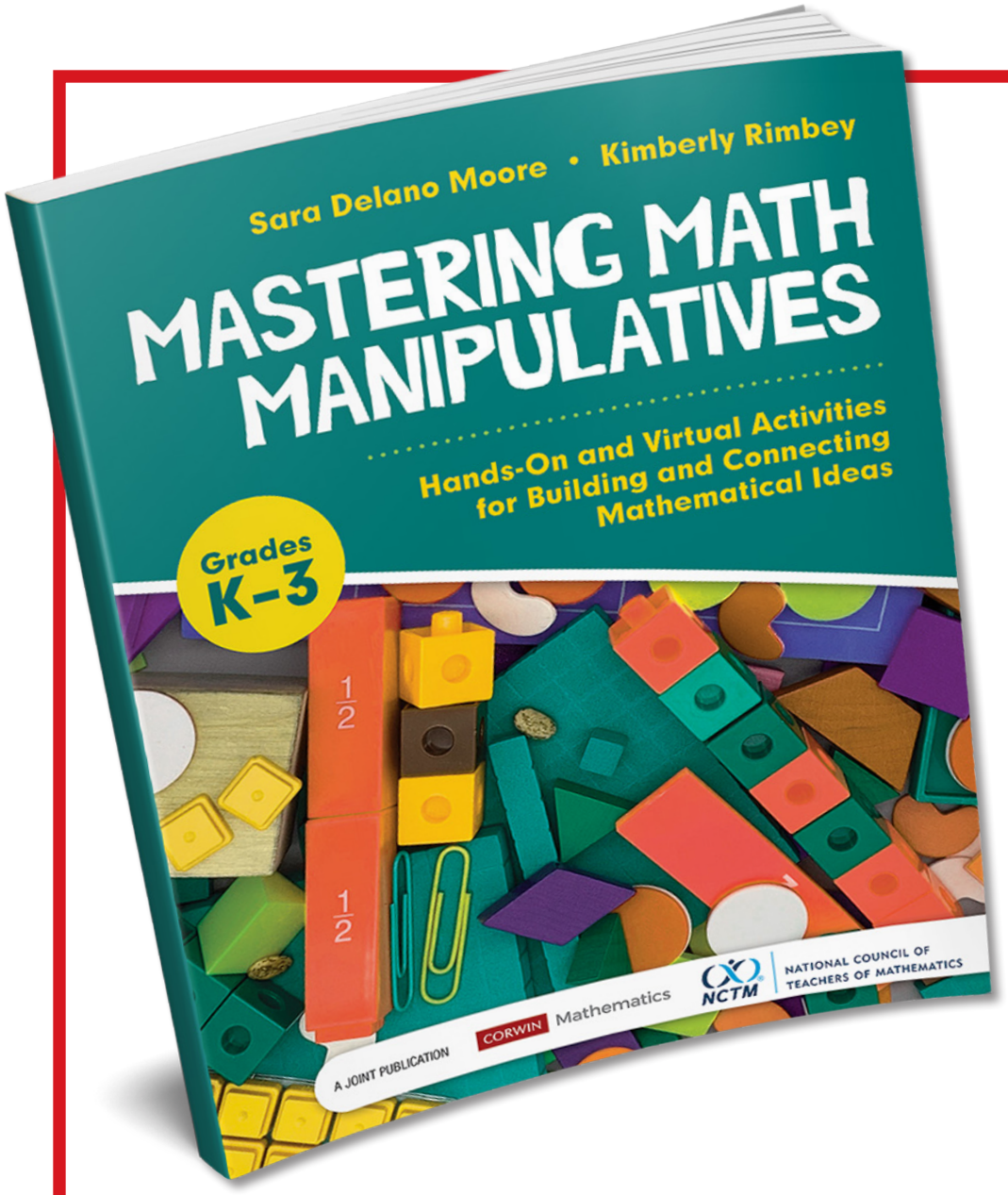

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ACTIVITY

5.8 SUBTRACTING WITH BASE-TEN BLOCKS

K | 1 | 2 | 3+

Materials

- Virtual base-ten blocks (or physical base-ten blocks and work mats)

Organization (virtual)

- **Getting Started:** Ensure students know how to use the virtual base-ten blocks; review annotation tools, taking screenshots, and so on.
- **Winding Down:** Take screenshots to save student work.

Mathematical Purpose

Students explore concrete representations for subtraction with regrouping using base-ten blocks.

Activity 5.8 Resources

- *Subtracting With Base-Ten Blocks* Activity Video

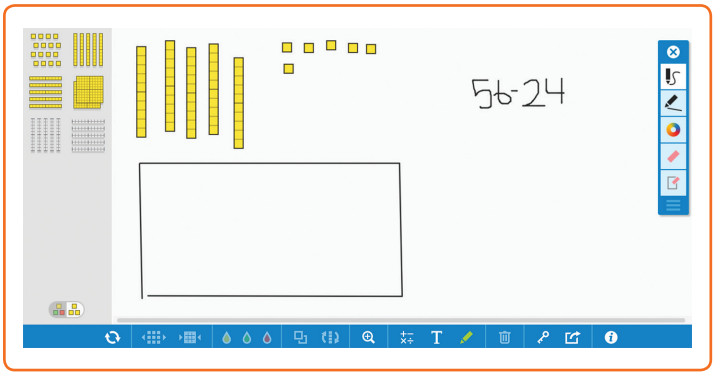
Manipulative Illustrated

Number Pieces app from Math Learning Center: https://apps.mathlearningcenter.org/number-pieces/

Steps

Notes: The examples here focus on two-digit subtraction. Change the numbers based on the number sets in which students are currently working. Also, this example requires that students are already familiar with naming and representing numbers in various ways, as explored in Activity 5.7.

1. Ask pairs of students to work together to solve 56 – 24 using base-ten blocks, with one student representing 56 and the other creating a space to "receive" the removed blocks (if using physical blocks, a second work mat will suffice). Support students' thinking by asking guiding questions such as the following:
   - *What is the meaning of subtraction?*
   - *What are we doing when we're subtracting one number from another?*
   - *What action is taking place?*
   - *Why did we create a "receiving" space on the screen?*



2. Ask students to move 24 pieces into the receiving space. Support their thinking by asking guiding questions such as these:
   - *How many pieces are left on the original mat?*
   - *How do you know this is correct?*
   - *Is the number represented in its simplest version? [Each digit must be directly represented by the number of pieces that represent the magnitude of that place.]*

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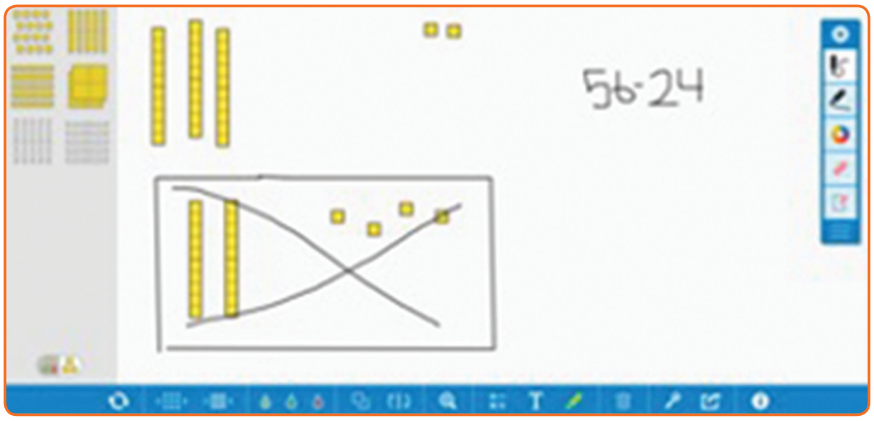
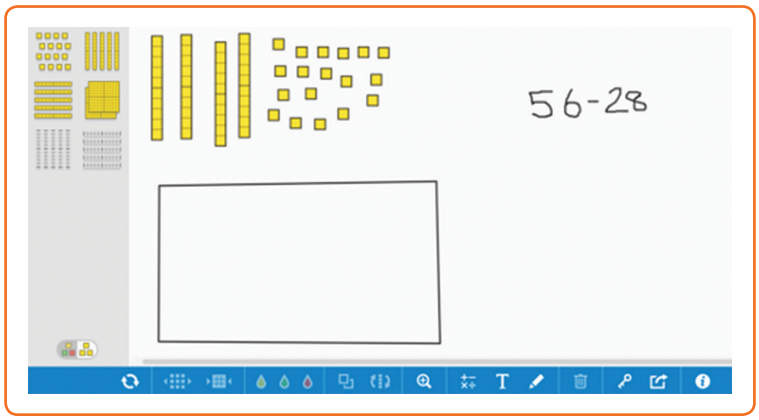


3. Ask students to clear their screens. Ask them to represent 56 − 28 using base-ten blocks, with one student representing 56 and the other creating a space to "receive" the removed blocks (if using physical blocks, a second work mat will suffice). Support students' thinking by asking guiding questions such as the following:
    - *Is 56 represented in a version that will allow you to easily remove 28?*
    - *Is there a friendlier version of 56 that will assist with this action [e.g., 4 rods and 18 unit cubes]? [Note: There is no need to talk about "borrowing" or "regrouping"—just renaming 58 as 40 and 18 will suffice for young learners.]*
    - *Now that you've made a "friendlier number," how will you subtract now?*



4. Ask students to proceed with the subtraction process, moving pieces that represent 28 onto the empty mat and covering them with a piece of paper.

5. Repeat with additional numbers as needed, continuing to ask guiding questions to help the students make generalizations as to when regrouping is needed.

Why This Manipulative?

Because base-ten blocks represent the place-value system using proportionally sized pieces, they can be used to represent arithmetic operations in base ten, representing the values in each place. This works quite well when no regrouping is necessary. However, when regrouping is necessary, as is often the case with multi-digit subtraction, the trading process can hinder some students' ability to see ten ones as concurrently existing as one group of ten. For that reason, using a virtual base-ten blocks model or a groupable manipulative, such as KP Ten-Frame Tiles or connecting cubes, may present a better option.

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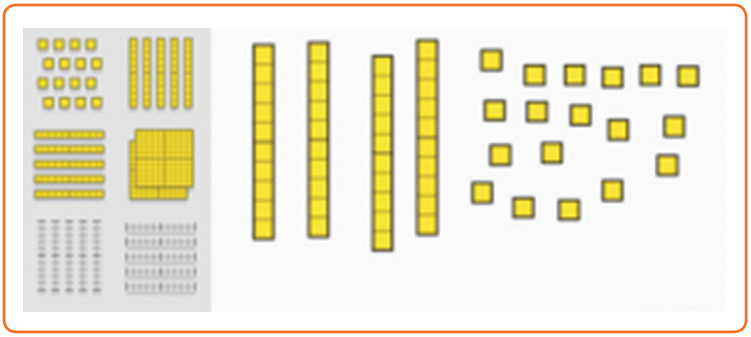
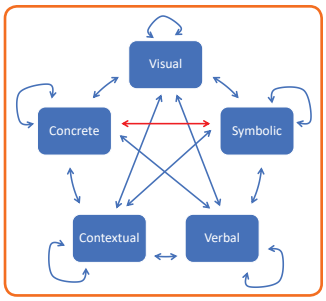


Developing Understanding

When using base-ten blocks, the "regrouping by trading" action can be confusing for students. The process introduced here requests that students first build a "friendly" version of the minuend so they will have enough of the corresponding pieces when they go to subtract. This avoids the need to "trade" for more pieces in the middle of the process.

Featured Connection

Use the Build the Equation strategy to connect the symbolic and concrete representations. First, students translate the minuend from their number cards to concrete representations. Then they use their concrete representation of the minuend to show the action of removing the subtrahend from the concrete/visual representation as indicated in the original equation.



Source: Lesh, Post, & Behr (1987).

In addition, you may choose to use the Create a Word Problem strategy at the end of this lesson to remind students that math represents real-world contexts. With this strategy, we are highlighting the connection between the concrete and contextual representations and adding tremendous value to students' understanding of the addition process. Eventually, you will want to repeat this activity and connect it to the Make a Sketch and Name Your Model strategies as well, connecting all three of Piaget's categories for representation: concrete, visual, and symbolic.

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