

## ACTIVITY IA5.1: Incrementing and Decrementing by Tens with Screened Bundling Sticks

**Intended learning:** To flexibly increment and decrement by tens in a quantitative context.

**Instructional mode:** Longer, inquiry mode for individuals or groups.

**Materials:** Bundling sticks – many bundles and loose sticks, screen (cloth or sheet of foam).

**Description:** Establish that each bundle contains ten sticks. Briefly display and then screen three bundles of sticks (see Figure 5.2). *How many bundles of sticks? How many sticks are there altogether?* Add another bundle under the screen. *How many sticks now?* Allow the child to check as needed. Continue to add bundles until there are 130 sticks. *How many sticks now? How many bundles now?* Remove a bundle. *How many sticks now?* Continue removing a bundle and asking for the total number of sticks and bundles until there are zero sticks under the screen.

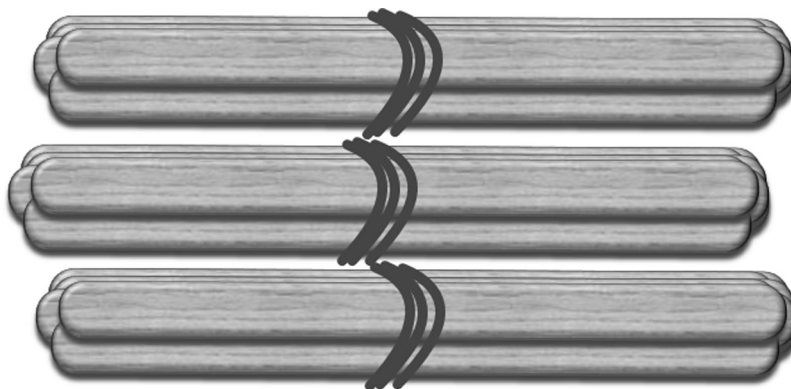


Figure 5.2 Three bundles of bundling sticks

Briefly display and then screen two bundles and four extra sticks. *How many sticks are there altogether?* Add another bundle under the screen. *How many sticks now?* Continue to add bundles until there are 124 sticks. *How many sticks now? How many bundles and left over sticks now?* Remove a bundle. *How many sticks now?* Continue removing a bundle and asking for the total number of sticks and bundles until there are four sticks under the screen.

**Responses, variations and extensions:**

- This task is designed to enable students to connect to a quantitative context, forward number word sequences (incrementing) and backward number word sequences (decrementing).

- Tracking the progressions on a 200 chart or ENL enables students to describe patterns and link quantities and numerals.
- When incrementing off the decuple, students often have difficulty with the 'teen' numbers. Beginning in the twenties will facilitate children recognizing the oral pattern of the numbers in the sequence (e.g. twenty-four, thirty-four, forty-four...).
- Bridging the century and century plus teen frequently poses a difficulty. For example, students may increment, '87, 97, 107, 207'. The bundling of ten tens into a bundle of one hundred (mega bundle) will facilitate child checking. Remove the last ten added in the sequence and ask, *How many was that?* When the student responds 107, ask, *Where is the one hundred?* When the student indicates the ten tens, add a big rubber band to form the mega bundle. Place the mega bundle back beside the seven extra. *How many was that altogether?* Add another ten. *Now how many?* If the student persists in stating 207, unscreen the collection to compare the relative size of the mega bundle (hundred) to the ten-bundle. *So do we have two mega bundles?* Remove the mega bundle and ask *How many now?* [17] Replace the mega bundle. *Now how many?*
- If necessary, the rubber bands may be removed from the bundles in order for the student to verify the number of sticks. The use of groupable base-ten materials is critically important until the student develops a mental construct of composite units and can regard tens and hundreds as units that are easily mentally composed and decomposed.
- Repeat the process with other collections (e.g. starting with five sticks) and track the increments and decrements on a 200 chart or empty number line (ENL). *What do you notice about all these numbers? How are the numbers the same? How are they different?*
- Modify the procedure by adding two bundles of ten at a time. Extend this by adding three or four bundles at a time. Record on the ENL or 200 chart.
- Once students can simultaneously conceive base-ten materials as both one ten and ten ones, use pre-grouped base-ten materials such as dot strips or base-ten blocks.
- Repeat the process by incrementing and decrementing by hundreds.
- Repeat the process by incrementing and decrementing by mixed tens and hundreds.