RAFT IDEAS

Topics: Math, Place value, Historical math tools, Addition

Materials List
✓ 8 5-gallon water jug caps without holes, or equivalent
✓ 40 5-gallon water jug caps with holes (preferably 10 each of 4 colors), or equivalent
✓ 4 identical rods with diameter ~ 13 mm (½"), ~ 45-50 cm (18-20") long
✓ Cardboard sheet, ~25 cm x 50 cm (10" x 20")
✓ Hot glue
✓ Cardboard circles
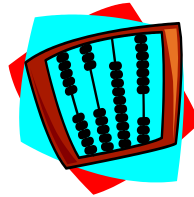✓ Marker

This Activity can be used to teach:
Common Core Math Standards:
• Addition and Subtraction (Operations and Algebraic Thinking, Grade 1, 6; Number and Operations in Base Ten, Grade 1, 4 & 6; Grade 2, 5 – 7; Grade 3, 2)
• Place Value (Number and Operations in Base Ten, Grade 1, 2; Grade 2, 1)

Abacus Primer
A Simplified Abacus to Teach Place Value

The abacus is an ancient tool for doing calculations. This activity uses a simplified abacus to teach place value. Each bead represents 1 in the given place, and students can use it to get a visual understanding that 10 beads in a given place (1s, 10s, 100s) can be represented by a single bead in the place to its left (10s, 100s, 1000s).

Assembly

1. Hot glue 4 of the whole bottle caps (without holes) to each end of the cardboard base about 6 mm to 13 mm (¼" to ½") apart, such that a rod can overlap a cap on each end of the cardboard.
2. Pull the tabs to remove the wide plastic strip from all caps with holes. These will be the beads of the abacus.
3. Thread 10 bottle cap beads onto each rod (ideally, each rod holds a different color), and then hot glue the rod and bead assembly to the base bottle caps.
4. Add labels on the ends of the rods (from left to right): 1000s, 100s, 10s, 1s.

"Base" bottle caps glued to cardboard

10 bottle caps threaded on each rod
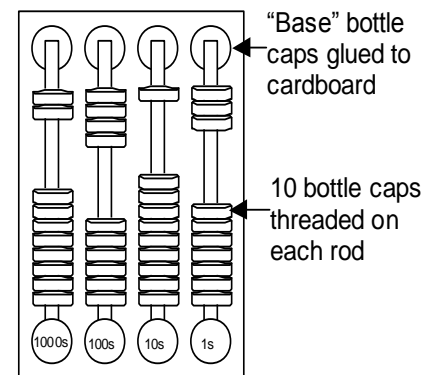
To Do and Notice
1. Show students that all 10 beads on one rod have the same value as one bead on the rod to the left.
2. Move beads to the top to represent numbers, have students read the beads and write down the number (for example, 2413 has, from left to right, 2 beads, 4 beads, 1 bead, and 3 beads moved to the upper position). Then reverse roles, write numbers and have students represent the numbers on the abacus.
3. Use the simplified abacus to help students visualize addition and subtraction numbers.

The Math Behind the Activity
The abacus traces its history to ancient Babylonia, where mathematicians and business owners used the precursor to the abacus, the counting board (containing no rods for the beads) (earliest dated sample: 300 b.c., known as the "Salamis Tablet"). Chinese mathematicians developed the first modern version of the Abacus, known as "Suen-pan", around 1200 a.d.

Teachers can use this simple version of an abacus as an excellent visual aid to teach place value and the concept of "0". Young children learning number sense rely on concrete examples to learn these abstract concepts.

Web Resources (Visit www.raft.net/raft-idea?isid=269 for more resources!)
• Teacher designed math courses from the New Jersey Center for Teaching & Learning – https://njctl.org/courses/math