

RAFT IDEAS

Topics: Math, Place Value, Historical Math Tools, Addition

Materials List

- ✓ Pony beads
- ✓ Thin straws, 3 mm (1/8") in diameter
- ✓ Corrugated cardboard or plastic
- ✓ Chenille stems
- ✓ Tape or label
- ✓ Scissors or paper cutter
- ✓ Wire cutting tool to cut chenille stems

This activity can be used to teach:

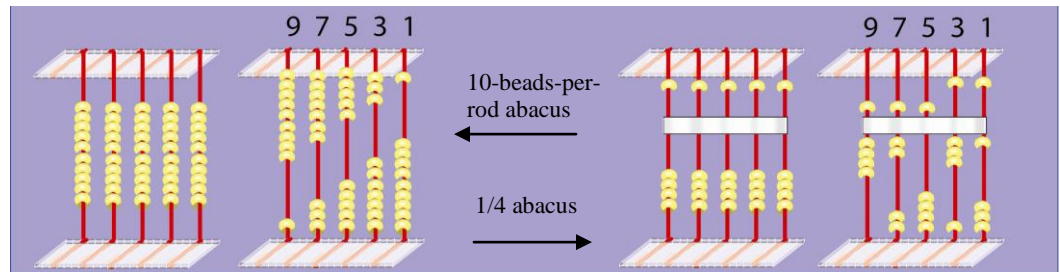
Common Core Math Standards:

- Addition and Subtraction (Operations and Algebraic Thinking, Grade 1, 6; Number and Operations in Base Ten, Grade 1, 4 & 6; Grade 2, 5, 6, 7; Grade 3, 2)
- Place Value (Number and Operations in Base Ten, Grade 1, 2; Grade 2, 1)



Abacus Variations

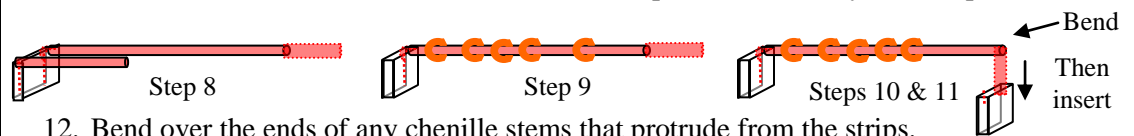
Create tools to explore place value, calculating, and number bases



This easily created version of an abacus can teach place value and show how different cultures calculate. Abaci can even be based on math systems other than base 10!

Assembly

1. Decide on which abacus to make. For types see the **Web Resources** below.
2. Cut 2 strips of corrugated cardboard 2.5cm (1") wide. Cut against the "grain" **so the long edge has the holes!** The strip's length depends on how many rods are to be inserted and the rod spacing. Cut the strips to the appropriate length.
3. Decide how many holes are needed between each rod. The spacing should be such that the beads on one rod can be moved easily without a finger accidentally touching any beads on either side.
4. Use straws that are 18 cm to 20 cm (7" to 8") long to create rods that hold 10 beads **or** straws half as long to make rods that will hold 5 beads.
5. The chenille stems are cut in half if the rods are to hold 5 beads.
6. Insert a chenille stem into a straw and center the straw on the chenille stem by pushing and pulling as required. Repeat until all the rods are made.
7. Insert an exposed chenille stem end into a hole near the edge of the corrugated strip. Insert until the straw on the chenille stem touches the strip. Repeat, for each rod, skipping the appropriate number of corrugated holes.
8. Bend the junction between the rods and corrugated strip to form a 90° angle.
9. Add the needed number of beads, for the selected design, onto each straw.
10. Bend the exposed ends of the chenille stems to form a 90° angle to the straw. The bend should mirror the bend on the other end of the rod.
11. Insert the bent chenille stem ends into a 2nd strip in the same way as in step 7.



12. Bend over the ends of any chenille stems that protrude from the strips.
13. To create a crossbar, separate the beads as needed and apply a strip of tape over the straws as shown in the illustrations at the top of the page.

To Do and Notice

- For activities with a 10-beads-per-rod abacus see the idea sheet *Abacus Primer*.
- Refer to the **Web Resources** section below for details on how to use an abacus.
- Have students move beads to represent specific numbers, add, subtract, etc.

Web Resources (Visit www.raft.net/raft-idea?isid=270 for more resources!)

- Abacus introduction - <http://www.ee.ryerson.ca/~elf/abacus/intro.html>
- History & types of abaci - <http://www.ee.ryerson.ca/~elf/abacus/history.html>
- Interactive abacus tutor - <http://www.tux.org/~bagleyd/java/AbacusApp.html>
- Collection of abacus related websites - <http://www.ee.ryerson.ca/~elf/abacus/>