

Topics: Patterns, Symmetry, Traditional Culture

Materials List

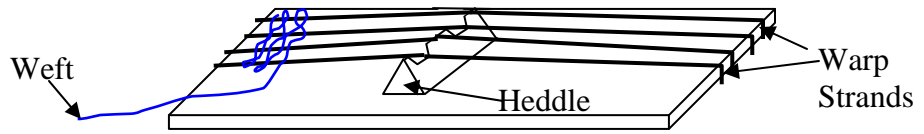
- ✓ Matte board
- ✓ Crochet thread
- ✓ Yarn
- ✓ Cardstock
- ✓ Masking tape
- ✓ Craft stick
- ✓ Pencil
- ✓ Ruler
- ✓ Optional: Spacer for warp strands

This activity can be used to support the teaching of:

- Observing Patterns (CA Math Standards: Mathematical Reasoning: Grade 3, 1.1; Grade 5, 1.1; Grade 6, 1.1; Grade 7 1.1)
- Traditional life and adaptation to environments (CA Social Science Standards: Grade 5 (Pre-Columbian America), 1.1; Grade 6 (Ancient Civilizations), 1.1 and 1.3)

Prism Heddle Loom

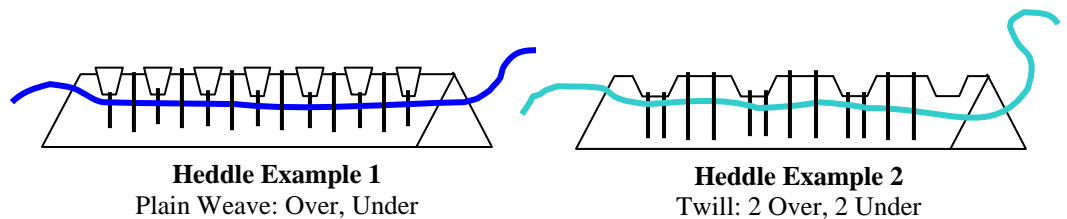
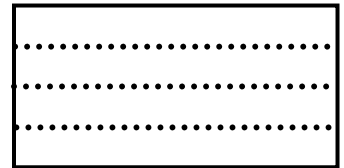
Encoding a Pattern to Make Weaving Easier



This simple loom encodes patterns into a prism-shaped piece of cardstock.

To Do and Notice

1. Mark desired increments onto the matte board using a pencil and ruler. Alternate assembly: Use spacers (e.g. – computer chip boards) attached to the back of the loom as spacers for warp strands.
2. To string the warp threads, wrap crochet thread around the matte board aligned to the marked increments. Tape the warp threads into place.
3. Knot a long string (weft) onto the left warp strand. Tape the other end of the weft string to a craft stick to create a shuttle.
4. A heddle pulls correct warp strands up in order to encode a pattern. Create a heddle by folding a piece of cardstock in half lengthwise, and then fold each edge to the centerline as in the illustration.
5. Fold this piece into a triangular prism shape by overlapping 2 sections and then secure with tape.
6. Align one edge of the prism heddle with the warp. Mark a pattern onto one edge of the prism (e.g. – over, under, over, under...) and cut out notches to hold the warp strands up or down as desired.
7. Place the heddle under the warp strands, and pull the weft through.
8. For the second row, move the heddle over one notch so that the pattern shifts.
9. Challenge students to try other patterns, such as 2 over, 2 under. This creates a diagonal pattern (twill) used in denim and other strong fabrics. It is more difficult to figure out than it sounds. If students need guidance, provide the following:
 - Two over, two under...
 - One over, two under, two over, two under...
 - Two under, two over...
 - One under, two over, two under, two over...
10. Repeat until the desired length of fabric or tapestry has been achieved.
11. Cut the warp off of the board at the back of the loom, gather the warp threads together and tie an overhand knot to secure each end.



The Content Behind the Activity

The development of weaving plant materials to create baskets and cloth were huge leaps in the history of technology. Baskets enabled hunters and gatherers to move and store foods for future use, and clothing protected man from the elements. As with any technology, weaving developed both functionally and aesthetically. Around the world, weavers experimented with different patterns, finding that some patterns were stronger than others (i.e. – twill is more durable than single weave.) Humans first wove flax into cloth at least 5,000 years ago. An endless, tedious, and repetitious task, spinning and weaving cloth were commonly the responsibility of women in many cultures. Invention of spinning wheels and looms (i.e. - the horizontal frame loom used in Europe since before the 1300's) helped make this task easier.

In 1804, the French silk weaver Joseph Marie Jacquard combined the ideas of earlier French inventors to create the Jacquard loom, which revolutionized the textile industry. This loom used a series of punched cards mounted on a cylinder above the loom; the holes in the cards controlled the position of hooks, which in turn, controlled the position of the warp threads, and thus the pattern woven into the fabric. This machine, a great example of the advances made during the industrial revolution, allowed one worker to complete large, complex designs in a short amount of time. Jacquard's loom provided machines with the ability to "read" weaving patterns printed on punched cards and quickly create a woven product from that specific card's program. This application of program and pattern recognition was the inspiration for early innovations in computing and led, eventually, to the creation of the early IBM computers of the 1950s-1960s that used punched cards to input information.

Taking it Further

For more activities involving weaving, see the RAFT Idea Sheets: *Bead Weaving*, *File Folder Weaving*, and *Binary Weaving*

Web Resources (Visit www.raft.net/more for how-to videos and more ideas!)

For more information on the history of fabric, visit: <http://www.fabriclink.com/History.html>

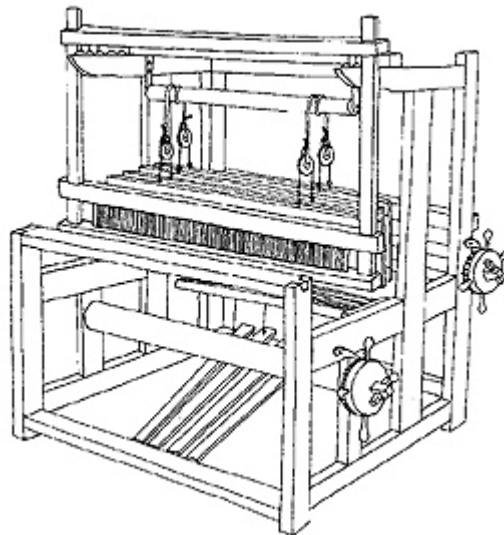


Image Credit: Handweavers Guild of America