

Weavers Bottom: Suggested Classroom Activities



If possible, take your class on a field trip to Weaver's Bottom Craft Studio. You could also watch the Working Artists video at

<http://www.berea.com/weavers-bottom/>

You can arrange for a visit and/or a hands-on experience by calling the studio at (859) 986-8661. You might want to connect this to a class field trip to experience the crafts of Berea.

Field Trips: You can arrange tours of Berea College's Historic Campus and/or the Student Craft Industry. Also available on limited dates are hands-on crafts activities in pottery, weaving, broom making, and woodworking, led by the Student Craft Education and Outreach Program. Reimbursement for transportation available on limited basis. Special *Arts across the Curriculum* field trips can be arranged through Berea Tourism. Contact the Berea Tourism Welcome Center at 800-598-5263. On this tour, studio artists demonstrate for your students and explain the history and processes of crafts like glass blowing, pewter casting,

weaving, lampwork, watercolor, and multimedia sculpture. Hands-on activities can also be customized to your class.

See the Field Trips file in General Resources for Educators for more complete information.

Classroom Activities

1. All Kinds of Looms: If you have any looms in your classroom, use them for a weaving activity. If not, there are numerous cheap and easy looms that you and your students can create from cardboard or Styrofoam trays. (You can also purchase inexpensive cardboard looms from suppliers like NASCO, Dick Blick, etc.) There are numerous websites with complete directions for projects of varying complexity. Here are some of the best:

- <http://www.teachersfirst.com/summer/weaving.htm>
weaving a belt on straws
- <http://www.art-rageous.net/Weaving.html>
photos of simple cardboard weaving project - Colonial Art
- <http://www.wonderhowto.com/how-to-weave-cardboard-loom-239221/>
Video of cardboard weaving

2. Paper Weaving: Paper weaving does not need to be boring. Endless variations can make this an exciting project even at the high school level.

Basic Directions:

- a. Use two pieces of 9" x 12" construction paper in contrasting colors.
- b. Fold one paper in half horizontally.
- c. Make a light line across the paper an inch from the edge of one unfolded edge. This is the limit of cutting.
- d. Make marks along this line and along the folded edge every inch and draw lines to connect the marks.
- e. Cut along these lines and unfold the paper to create your "loom" with "warp threads."
- f. Cut the other paper into strips 9" x 1". These will be your "weft threads".
- g. Weave the strips across the loom alternating over and under to create a checkerboard pattern. Pattern: Over 1, Under 1
Under 1, Over 1

- h. If the previous weft thread went under the warp thread, the following row will begin by going over the warp.
- i. With a dab of glue, secure the loose ends of the strips in place.

Variations:

- Challenge students to create stripes instead of checkerboard using the same weaving pattern.
- Use more than one color for the weft pieces. Experiment with 2-4 colors.
- Cut irregular lines instead of straight lines
- Weave with strips of varying widths.
- Weave with alternative materials, such as ribbons, paper shredded in a paper shredder, or raffia.
- Use oaktag or other durable paper for your "loom" and "warp" and weave with materials like feathers, dried grasses, pipe cleaners, thin twigs, yarn, fabric, plastic bags, corn husks, metallic wire, etc.

Extension: (Project the storyboard "What Do You Do with the Neckties: and discuss the Colmers' use of recycled materials. Discuss the idea of environmentally friendly art made from recycled materials.

- Create your "loom" and "warp" from a glossy magazine page.
- Create patterns on both your pieces of paper (warp and weft) before beginning the project
- Vary the pattern. Instead of plain weave (over one, under one), use

basket -

Over 2, Under 2

Under 2, Over 2

Twill -

Under 1, Over 2, Under 1, Over 2

Over 1, Under 1, Over 2, Under 1

Over 2, Under 1, Over 2, Under 1

Under 1, Over 2, Under 1, Over 2

Herringbone

Under 1, Over 2, Under 1, Over 2

Over 1, Under 1, Over 2, Under 1

Over 2, Under 1, Over 2, Under 1

Under 1, Over 2, Under 1, Over 2

Over 2, Under 1, Over 2, Under 1

Over 1, Under 1, Over 2, Under 1

Repeat entire pattern from beginning.

- See <http://www.origami-resource-center.com/weaving-patterns.html> for more complex weaving patterns.
- Have students create their own pattern on graph paper and then execute it in paper weaving.

Math/Visual Art

Weaving is an art form that requires strong mathematical and spatial skills. There are math/weaving activities listed below at each grade level, but some basic math/weaving activities can be easily adapted to any grade level.

Elementary: Math symmetry: If you did any of the weaving or paper weaving activities, begin with a discussion of the symmetry found in the patterns the students created. How many lines of symmetry can be drawn for each pattern? What kind of symmetry do the various patterns possess?

- Next project the patterns found on <http://www.handweaving.net/Home.aspx> and lead the same discussion.
- Challenges students to design a weaving pattern on graph paper that illustrates a specific type(s) of symmetry. You may assign the type(s) of symmetry or allow free choice.
- Challenge them to graph the reverse side of their pattern and describe its symmetry.
- Ask them to establish a point of rotation in the center of a piece of graph paper. Ask them to design a pattern in one quarter of a piece of graph paper and then to use rotations, reflections, and/or translations to reproduce the pattern in the other quadrants. Ask them to explain their process.

Extension 1: Ask students to execute their design in weaving or paper weave.

Extension 2 (for advanced students): Have them go to http://www.maa.org/pubs/mm_supplements/farris/rope.html for a very challenging project.

INTERMEDIATE Math

1. **Figuring the SETT:** For this project you will need rulers and yarn in two different thicknesses. The sett of a weaving pattern is the density of its warp threads. This will vary depending on the diameter of the yarn to be used and

the intended use of the cloth - whether it will be used for a loosely woven shawl or as tightly woven coverlet.

Begin by providing groups of students with rulers and a length about 2 feet of yarn and challenge them to figure out how many widths of yarn would fit in an inch. Tell them to assume that you will be making a tightly woven piece so you'll want the yarn packed closely enough to just barely touch.

Give them a chance to share their strategies. If no group suggests it, show them how to wrap the yarn around the ruler to fill up the space of one inch and count the number of threads.

Now suppose you are going to use yarn of two different thicknesses and you are going to use them in the ratio of 2" of thin yarn to every 1" of thick yarn. Ask the group to come up with a strategy for figuring out the sett of the warp in this case. Allow the strategies to share their strategies.

If no group suggests it, show them how to wrap 2" of the ruler with thin yarn and 1" with thick yarn, count the yarn wraps and divide by 3.

Give them different ratios of thick and thin yarn and ask them to figure the sett.

Social Studies (Culture)/Visual Arts/Writing/Technology

1. Native American Weaving

Many Native American cultures of the past and present have created clothing, rugs, and blankets by weaving. Divide the class into small groups and have each group research the weaving traditions of one particular culture. Ask them to create an oral or written report with visuals or a power point or multimedia presentation to share what they have learned with their classmates. Ask them to be sure to include information about the geographic location of the culture, the materials they use, the techniques, and the cultural significance of hand weaving.

Some good sites to begin their research are:

- <http://www.kstrom.net/isk/maps/rugmap.html> and <http://www.navajorugrepair.com/navajorug.htm>
Navajo Rugs

- <http://www.nativetech.org/finger/belts.html>
Native American finger weaving in the Eastern Forests
- <http://www.nativetech.org/seminole/sashes/instructions.php>
Seminole

Extension: An excellent book about Navajo weaving traditions is Songs of the Loom by Monty Roessel.

2. Weaving in Colonial America

During the Colonial Period, many women wove for their domestic needs, but large scale weaving manufacture was discouraged in order to force the Colonists to purchase manufactured cloth and clothing from the many factories in England. Still, some Colonists did produce and sell cloth. As soon as the Revolution began and imported goods were cut off, weaving became a patriotic duty, and weavers set up shops all over the Colonies. Weaving was learned through apprenticeships.

Go to <http://www.history.org/Foundation/journal/Winter07/weaving.cfm> and project the site to read with your students. This tells about weaving in Colonial Williamsburg with many illustrations.

Discuss what you have learned and assign students to write a journal entry from the imagined perspective of one of the following:

- A woman producing woven cloth for her family.
- A woman shopping for clothing for her family and having to pay the high cost of imported clothing from England because none is produced locally.
- A weaver who came to America from England in hopes of setting up a weaving shop who discovers the high price he would have to pay.
- A weaver who has to pay high levies on his looms and cannot export his cloth.
- A weaver who has just set up shop after the Revolution has begun.
- An apprentice in one of the shops above.
- A family member of any of the above.

MIDDLE SCHOOL Math

1. **Accounting for shrinkage and waste:** Before beginning a project, a weaver must calculate how much yarn is needed. Provide your students with rulers, a

piece of yarn about 2" long for each group, and the information below and ask them to solve the problems by creating algebraic equations.

Calculating the Yarn Needed for Your Warp

Woven cloth shrinks when it is first laundered, so when you are calculating the length of the warp for a project, you have to increase the length by the percentage of shrinkage in order to end up with the length that you want. Let's say that you want to end up with a table runner that is 36" long, and you know the yarn you are using usually shrinks 12% . You also plan to make 2" hems on each end. How long should your warp threads be?

You also need additional warp length so that you can tie the warp ends to the back and front of your loom. This is called "loom waste." You should allow about 27" for this. How long is the warp length that you need with this amount added?

To avoid having so much "loom waste," you decide to make three table runners of the same size. That way you only have to add the loom waste one time and you can make three runners. How long is the warp length now?

Next you need to calculate the width. If you want to end up with a table runner that is 15" wide and you need to allow for 12% shrinkage, how wide do you need to make it?

Next you need to figure out how many yarn ends you will have per inch. An easy way to calculate the yarn ends per inch (known as the "sett") is to wrap a length of yarn around a ruler to fill up the space of one inch when each wrap of yarn is just touching its neighbor. Count the number of threads per inch. Now how can you calculate how many yards of yarn you will need for the warp to make three table runners 15" x 36"?

Yarn is usually sold by the pound. The yardage measurement is marked on the cone. Assuming that the yarn you are using has 1500 yards per pound, how many pounds of yarn would you need for your warp?

Extension: If you also visited Powdermill Pottery, there is a similar problem with shrinkage. Ask students to identify other situations where knowing how to work with percentage of shrinkage or expansion might be helpful.

Social Studies/Writing/Technology

1. **Sixth Grade:** Almost every contemporary culture has a weaving tradition. Divide students into small groups and assign each group to research the weaving tradition of one group and to create a multimedia presentation on the aesthetic, technical, and cultural elements of their culture's weaving tradition. You may allow free choice or assign particular cultures. A good place to start is:

Weaving traditions in diverse cultures

- <http://www.jacobsenrugs.com/indpics.htm> and <http://www.jacobsenrugs.com/india.htm>
India
 - <http://www.nishijin.or.jp/eng/history/history.htm>
History of weaving in one Japanese village
 - <http://www.beduinweaving.com/>
The Beduin of Saudi Arabia
2. **Seventh Grade:** Like pottery, weaving is one of the most ancient art forms and one of the oldest technologies. Divide students into small groups to research the weaving history of one ancient culture. Alternatively, you can incorporate the research into each culture's weaving technology and economy as you come to that period/culture. Be sure to consider aspects such as how cultural beliefs, specialization, advancing knowledge, migration of ideas, trade, and/or isolation are reflected in the weaving industry or domestic weaving tradition of the various cultures/time periods. Helpful websites include:
 - <http://www.weavingartmuseum.org/main.html>
Historic weaving cultures of the eastern Mediterranean
 - <http://scholar.chem.nyu.edu/tekpages/loom.html>
Medieval technology - the horizontal loom
 - <http://threadsintyme.tripod.com/id30.htm>

Scroll down about midway for history of weaving - interesting discussion of technical advances in weaving and looms in ancient times

After completing their research, students should write a fictitious slice-of-life story or journal entry as if they were a weaver or member of a weaver's family from the period/culture.

3. **Eighth Grade: Weaving in Colonial America**

During the Colonial Period, many women wove for their domestic needs, but large scale weaving manufacture was discouraged in order to force the Colonists to purchase manufactured cloth and clothing from the many factories in England. Still, some Colonists did produce and sell cloth. As soon as the Revolution began and imported goods were cut off, weaving became a patriotic duty, and weavers set up shops all over the Colonies. Weaving was learned through apprenticeships.

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- A weaver who has just set up shop after the Revolution has begun.
- An apprentice in one of the shops above.
- A family member of any of the above.

HIGH SCHOOL Arts and Humanities/Writing

1. A fabulous lesson integrating music, painting, and weaving can be found at this website: <http://cdn.dickblick.com/lessonplans/pdfs/Canvas-Looming.pdf>
2. Refer to the basic instructions for creating a paper weaving in the Arts and Humanities section for All Levels. An interesting variation for high school

students is to have them create a landscape painting or drawing on one piece of paper and a portrait on another. (The portrait and landscape can be created in your choice of medium or you may allow free choice). There should be a strong connection between the two, such as a self portrait and a scene of importance to the student or a portrait of an important historical or cultural leader and a landscape representing their homeland and/or times. One paper should be cut as directed to create the "loom" and "warp," while the other is cut into strips to create the "weft." Students can decide on the width and regularity of the cuts and may also decide to interject some alternative materials such as a ribbon or feather, but the main components should be the portrait and landscape. The concept is to make a statement about the interweaving of personality and place.

Extension: Have students write a poem inspired by George Ella Lyon's "Where I Am From" poem. Find the poem and more information about it as an inspiration to writers at <http://www.georgeellalyon.com>

3. Math - Weaving Patterns can also be designed using algebraic formulas. Project the article at <http://fiberarts.org/design/articles/algebra.html> and discuss with students how this weaver has used algebraic expressions as the basis for creative expression. You might use the example she has presented and have your students create patterns on graph paper with colored pencils to represent the formula explored, or you might present them with another formula or allow free choice in selecting a formula to use as the basis for creating a graph paper pattern.

Extension: Allow student time to create their design as an actual weaving.

4. For Advanced Students: Invite students to go to the website http://www.maa.org/pubs/mm_supplements/farris/rope.html and observe how turns, reflections, and translations are used to create a complex pattern. Encourage them to go to the Java Applet link at the bottom of the page and try to create a pattern of their own.

- They may also want to visit <http://www.handweaving.net/Home.aspx> and create and contribute a draft. This website contains 58382 hand weaving drafts, with more being added often. Each draft includes the standard threading, tieup, treadling, and color drawdown. Drafts can be viewed, printed, and downloaded in WIF format. You can easily share your own drafts with other weavers here using our [draft contribution](#) page.

- <http://weaverly.typepad.com/weaverly/2009/09/random-weaves-1.html>
and
<http://evasweaving.wordpress.com/2009/09/23/designing-accidental-weaves/>
and <http://maggies-textiles.blogspot.com/search/label/Twills;%20Random%20Numbers;%20%20Take%20It%20Further%20challenge>

These sites all discuss weaving with patterns based on random number generation or probability. Very interesting for advanced weaving students or mathematically inclined students. This would make an excellent independent project.

Social Studies/Culture/History/Economics and Technology

The life of Jacquard, inventor of the Jacquard Loom and punch card technology, reflects the social, political, economic, and technical changes during the French Revolution. Ask students to research his life and write a brief biography emphasizing how the man and his work were both affected by and affected society during his lifetime. A good website to begin investigation is http://en.wikipedia.org/wiki/Joseph_Marie_Jacquard