

Weaving Patterns and Computational Thinking

Shared by: Diane Brancazio, MIT Edgerton Center K12 MakerLab Team

Specialized tools/technology used:	Experience level required:
Yarn, recycle cardboard, yarn	beginner

Grade Level / Subject (of this example): Technology 7, appropriate for grades 3 - 12

Topic/Content Standards (for this example): Coding / Computational thinking

Students are introduced to computational thinking and coding concepts through hands-on weaving and pattern design – no computers needed! Fabric squares with custom designs are made by weaving bulky yarn on a cardboard loom. Each row has a sequence of under and over weaves, and there will always be at least 2 types of rows. Together, the rows make up a pattern simple or complex, and the students create their own fabric square. For strong fabric with sides that do not unravel, there are rules that must be followed, such as the number of “unders” or “overs” in a row, and how to start the yarn in the next row.



There are several parts of the activity, used as fits the available time and student readiness.

1. Look at samples to identify different weave types and figure out the rules that woven fabrics must follow.
2. Create instructions or “codes” that explain how to do a particular weave, then relate to computer coding and algorithms.
3. Create patterns for fabric squares on graph paper, including common weaves or designing a new one. (Decide on starting with two or more colors)
4. Make a cardboard loom and weave their own fabric square
5. Create a “code” to explain the custom fabric square they designed and have another student follow the code to verify it (on graph paper or woven). Relate to computer coding concepts (algorithms, functions, variables, repeat loops, etc.)

6. Compare and contrast fabric squares in terms of patterns, codes, or other features
7. Create a quilt/tapestry by joining all the fabric squares.



Resources and References

<https://www.heddels.com/2017/12/7-weave-patterns-to-know-twill-basketweave-satin-and-more/>
<https://www canvasetc.com/what-is-twill/>
<https://www.theweavingloom.com/weaving-techniques-herringbone-weave/>
<https://www.exploratorium.edu/tinkering/blogs/weaving-randomness>
<https://www.exploratorium.edu/tinkering/blog/2018/05/10/weaving-roundup>

Possible Content Extensions (with thanks to Diane Horvath, Medfield Middle School)

Mindfulness activities, such as done in Homeroom/Advisory period

- Hands-on project that is satisfying, can be taken up and put down, requires attention and provides a creative outlet. (Resource for Health benefits: <https://well.blogs.nytimes.com/2016/01/25/the-health-benefits-of-knitting/>)
- Use colors or different materials (ribbon, twine, paper, etc.) to indicate emotion or mood.
- Turn your Fabric Square into a Smile/Face- <https://knitasmile.com/smileathome-project/>
- Mend or upcycle old clothes using a weaving technique- <https://www.theweavingloom.com/weaving-techniques-woven-patch/>
- As a community- outdoors *yarn bombing* project, create a weaving pattern in a fence or join several weaved fabric squares together to wrap around a tree, pole, or bench.

Science

- Document climate/weather patterns using color - <https://www.thiscolossal.com/2020/02/weather-blankets-climate-crisis/>