

Indigenous Mathematics Education Symposium May 11 2021

Resources Connecting Beadwork and Mathematics in the Classroom

Indigenous Math Education Network:

<https://indigenous.mathnetwork.educ.ubc.ca/>



[Nico Williams Hyperblanket](#)

Virtual Bead Loom:

<https://csdt.org/culture/beadloom/index.html>

The above resource is cited in the Math First Peoples Teacher Resource Guide, developed by the First Nations Education Steering Committee (FNESC) from British Columbia. In the guide, they say that the virtual bead loom is “an interactive website where students choose a basket design, then replicate it using coordinate geometry. They can choose the coordinates of points, lines, and shapes on the grid, and choose fill colours. Easy to use, yet challenging enough to be engaging. There are many references to the cultural background through information and photographs. The tutorial can be used by teachers and students to find all the parts of the website. The “Beginners Software” link uses one quadrant of the grid, whereas the “Software” link uses all 4 quadrants (more suitable for Gr 8, and it’s actually easier to keep track of the points). In the “Teaching Materials” link there are many well done lesson plans for using the virtual bead loom.”

First Nations and Métis Math Voices:

<https://sites.google.com/teltgafe.com/indigenouslearnersinmath/resources>

The link above contains multiple resources developed for supporting indigenous learners in mathematics. The paper *Exploring Multiplicative and Algebraic Thinking Through Algonquin Beadwork* has particular relevance. While the context is the elementary level, it is easy to extend the ideas in this article to the context of slope and rates of change; a pivotal concept in the secondary mathematics curriculum. There are also opportunities to explore tessellations, as seen in *Willow Road PS students find the math in Indigenous techniques of the peyote stitch* <https://www.ugdsb.ca/blog/willow-road-ps-students-find-the-math-in-indigenous-techniques-of-the-peyote-stitch/>

Contemporary Geometric Beadwork:

<https://beadmobile.wordpress.com/>

The above link is an open source architectural beadwork project from Kate McKinnon and a worldwide team of innovators. In this link, you'll find numerous resources for constructing and assembling geometric beadwork pieces. You can watch a video on McKinnon's work at <https://youtu.be/QL6JHxaiSg>

With Paykiiwikay podcast on traditional metis beading and sewing work for Secondary:

<https://soundcloud.com/paykiiwikay/amy-briley-traditional-metis-beadwork-and-sewing>

The link above is to a podcast which examines the cultural importance of traditional metis beading and how it can be integrated into secondary teaching.

Hexaflexagons:

https://www.maa.org/sites/default/files/pdf/pubs/focus/Gardner_Hexaflexagons12_1956.pdf

The hexaflexagon is a simple, geometric object, which may be constructed with a single piece of paper and a small piece of tape. Nico Williams uses the hexaflexagon within his geometric beadwork. When a piece of paper is folded in the manner detailed in the article above, the result is what appears to be a two-sided hexagon. However, the manner of folding results in a 2D shape that "flexes" to reveal a third, hidden side! While this object may seem simple at first glance, there is a deep mathematical structure within. The book, *A mathematical tapestry: demonstrating the beautiful unity of mathematics* contains an entire chapter dedicated to the hexaflexagon, including a proof that the motions of the hexaflexagon make up an algebraic group of 36 elements: the dihedral group D_{18} .

Exploring First Nations Beadwork and Connections to Math

https://aboriginalresourcesforteachers.weebly.com/uploads/3/0/3/5/30354089/beading_lesson.pdf

The above link is a lesson plan developed by Nadine McSpadden of the Surrey School District in British Columbia. This lesson is intended for students in grades 1-3 and details how to help students build a counter made with beads to use in playing the traditional Mi'kmaq game, Waltes. For more information on Waltes, visit <https://www.cbc.ca/news/canada/nova-scotia/mikmaq-waltes-dice-bowl-game-1.3484894>

Indigenous Knowledge and Perspectives in British Columbia Mathematics K-12 Curriculum:

<https://curriculum.gov.bc.ca/curriculum/indigenous-education-resources/indigenous-knowledge-and-perspectives-k-12-curriculum>

The above link is from the British Columbia Ministry of Education and details curricular connections between Indigenous knowledge and the mathematics curriculum, at all grade levels. Interdisciplinary connections at various grade levels are also included.