

Haída Legends: Culturally Responsive Mathematics

The following lesson idea is shared by Haida Gwaii educators: Cathy Baran (k/1 teacher), Michelle Hagenson (k/1 teacher), Peter Reynolds (grades 4/5 teacher), Dan Burton (grade 7 teacher), Marcy Perren (grades 8 & 9 teacher), Kim Madore (secondary teacher) and Joanne Yovanovich (Principal of Haida Education).

The following lesson stems from the legend “Raven Brings the Light” and involves exploring the mathematics of building paper bentwood boxes. Cultural information and ways of constructing actual Haida bentwood boxes can be found at:

www.skidegate.ca/Boxes.html



Grade 1 student with paper bentwood boxes she constructed

Math Through Haida Legends

Raven Creation: The Light

(grades k-3)



The Big Mathematical Ideas

- There is a relationship between 2-dimensional figures and 3-dimensional objects.
- How much space something takes up or can hold can be measured.
- Comparative language (more than, less than) can be used to describe the volume and capacity of a container.

Materials/Resources

- Legends of the Old Masset Haida: Gaaw Xaadee Gyaahlaangaay Raven Brings the Light (produced by CBC Radio) available at <http://www.cbcshop.ca>
- Raven Steals the Light by Gerald McDermott
- Boxes of various of shapes and sizes (ideally without glued seams, especially for Kindergarten and grade one)
- Cube template (net) without lid
- Bentwood box (if available)

The Lesson

- Read the story or listen to the legend on the CD.
- Ask questions related to the box in the legend
 - Have you ever seen a box like this before?
 - What do you know about boxes like these?
- Show a bentwood box
 - “What shapes do you see?”
 - “What could you hold in the box?”
 - “How many corners can you count?”
- Show and have students describe the faces, vertices and edges of the box.
- Give each student or pair of students a box to unfold and deconstruct. Circulate as students are working, listening and asking what they are noticing. Have students share what they are finding and any surprises.
- Have students reconstruct their boxes.
- Provide each student with a template/net of cube. Hold an example up and ask questions such as,

“What shapes do you see?”

“Can you make a picture in your head of what it may turn into?”

“Can you see something in the classroom that is the same shape that this will be?”

- Have students cut out the template and construct it, folding and cutting as necessary and using tape to hold edges together. (Assistance may be needed for taping edges or cutting, depending on the age and ability of the students.)
- Have students compare their boxes and share their thinking.
 - “What could your box hold?”
 - “What size do you think the ball of light (in the Raven story) was?”

What to watch and listen for...

- Are students using the correct geometrical language and terms to communicate their ideas?
- Do students see a connection between 2D shapes and 3D objects?
- Are students using comparative language? (will hold more/less, bigger/smaller)
- Are students making connections between the boxes they are deconstructing and constructing and the bentwood box from the legend or others they know about?
- Are students engaged in the process of exploring construction and deconstruction?

Questions and problems to extend thinking...

- Show students the open cube net and have them consider where they would need to add a square to have lid on their box, and then have them add a square and test it, making changes to their plans as necessary.
- How would we create a smaller or bigger box than this box? (connect to nesting bentwood boxes in the legend)
- Estimate and check capacity of box for different items, “How many cotton balls would your box hold, jelly beans, erasers, etc?”

Related K-7 Mathematics IRP (2007) PLOs:

Kindergarten

- Use direct comparison to compare two objects based on volume and capacity
- Build and describe 3D objects

Grade One

- Demonstrate an understanding of measurement as a process of comparing
- Compare 2D shape to parts of 3D objects in the environment

Grade Two

- Identify 2D shape to parts of 3D objects in the environment
- Describe compare and construct 3D objects

Grade Three

- Describe 3D objects according to the shape of the faces, and the number of edges and vertices

