

First Nations, Métis, and Inuit Student Challenge

Inspired by Indigenous Innovation - Birch Bark Canoe Design



Class Competition Entry

School: _____

Teacher: _____

Grade: _____

Class Team Name: _____

Number of Students: _____



Welcome Engineers!

Your Challenge

For thousands of years, Indigenous Peoples across Turtle Island designed and built canoes that were perfectly adapted to their environments. These canoes allowed people to travel across rivers and lakes, transport supplies, fish, trade, connect communities, and share knowledge.

The birch bark canoe is an incredible example of Indigenous engineering. Builders carefully selected materials, considered the environment, and designed structures that were lightweight, strong, and efficient.

Today, engineers continue to solve problems by studying materials, testing ideas, and improving designs.

Your Mission

Your class has been challenged to become a team of engineers.

Your goal is to:

1. Research Indigenous canoe technology.
2. Design and test small prototype canoes.
3. Use engineering thinking to improve your ideas.
4. Build a final class canoe using recycled cardboard and Makedo tools.
5. Submit your Engineering Design Portfolio.

🏆 The winning classroom will receive a pizza party!





Indigenous Innovation: The Birch Bark Canoe

Engineering Inspired by the Land

The birch bark canoe is one of the most remarkable technologies developed by Indigenous Peoples across North America.

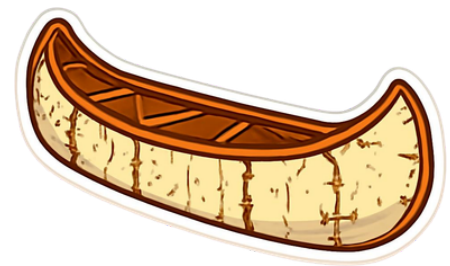
Different Nations developed different canoe designs based on their environments, waterways, and needs. A canoe designed for a fast river would not be the same as one designed for a large lake.

Indigenous canoe builders used careful observation and generations of knowledge to understand:

- Which materials were strongest
- How shapes affected movement
- How to balance strength and weight
- How to build with respect for the environment

Traditional birch bark canoes often used:

- Birch bark for the outer covering
- Cedar for ribs and framework
- Spruce roots for sewing
- Spruce gum for waterproofing



These materials created a canoe that was lightweight, repairable, and well suited to travel.

Think Like an Engineer

What engineering problems did canoe builders solve?

- ☐ How to make a canoe lightweight
- ☐ How to keep water out
- ☐ How to make the canoe strong
- ☐ How to make it stable
- ☐ How to carry supplies

Our Class Learning

What did we discover about Indigenous canoe technology?



Our Engineering Teams

Engineers work together with different skills.

Our class will divide into smaller design teams.

Prototype Teams

Team 1 Members:

Team 2 Members:

Team 3 Members:

Team 4 Members:

Team 5 Members:

Team 6 Members:

Possible Engineering Roles

Research Engineer

- Learns about Indigenous canoe technology

Design Engineer

- Creates sketches and plans

Materials Engineer

- Tracks materials and construction

Build Engineer

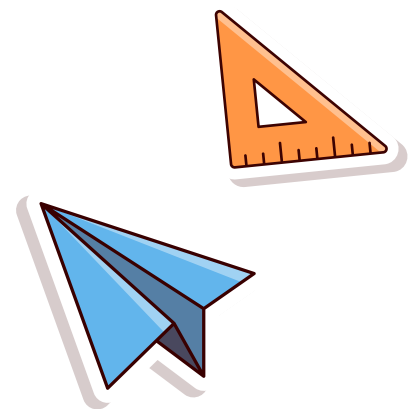
- Leads construction

Testing Engineer

- Records results

Documentation Engineer

- Captures photos and reflections





Prototype Design Challenge

Team Prototypes

Each engineering team will create a smaller canoe prototype.

Prototype Goal:

Create a canoe that is:

- ✓ Stable
- ✓ Lightweight
- ✓ Strong
- ✓ Efficient with materials

Prototype Requirements

Approximate size:

Length: 40–50 cm

Width: 15–20 cm

Team Design Sketches

Team Name:

Draw your sketch here.

Our Design Choice

Why did we choose this design?

[illegible]



Choosing Our Final Design

After testing prototypes, our class will decide what features belong in our final canoe.

Our Final Canoe Will Include:

Hull Design

Strength Features

Lightweight Features

Indigenous Engineering Ideas That Inspired Us



Building Our Final Canoe

Final Canoe Requirements

Our final canoe must:

- ✓ Be primarily made from recycled cardboard
- ✓ Use Makedo construction tools
- ✓ Be between 75–100 cm long
- ✓ Show evidence of engineering planning
- ✓ Be tested and improved

Final Testing & Reflection

Our Final Canoe Results

Final Canoe Length:

_____ cm

Cargo Capacity:

_____ lbs

Testing Notes:

What Worked Best?

What Would We Improve?



Engineering Reflection

What did we learn from Indigenous innovation?

How did research influence our design?

How did our class use the engineering design process?

Why is it important to recognize Indigenous technologies as important innovations?

Competition Submission

Class Engineering Statement

Complete this sentence:

"Our canoe represents Indigenous-inspired engineering because..."

Submission Checklist

- ☐ Completed research
- ☐ Built prototype designs
- ☐ Tested and improved ideas
- ☐ Built final canoe
- ☐ Completed reflection
- ☐ Included photos

Please submit this document and photos of your final canoe to:



Skills Ontario's Judging Rubric (100 Points)

Category	Points
Understanding of Indigenous Innovation	20
Engineering Design Process	20
Creativity & Problem Solving	20
Testing & Improvements	20
Communication & Reflection	20
TOTAL	100

Final Note for Teachers

This challenge celebrates Indigenous innovation by exploring the engineering principles behind traditional technologies. Students are not recreating a cultural artifact; they are learning from Indigenous ingenuity, applying engineering practices, and recognizing the continued importance of Indigenous knowledge and innovation.

Thank you to our FNMI Program Sponsors:



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