The Traditional Hawaiian Canoe: A Vessel of Culture and Connection

Integrating Culture, Science, and Traditional Practices of the Hawaiian Canoe to Address Present-Day Challenges

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Course Overview

This course explores the cultural, ecological, and engineering dimensions of the traditional Hawaiian canoe. Through project-based learning, students examine how ancestral knowledge, environmental stewardship, and modern science intersect. Students participate in hands-on projects, engage with cultural practitioners, and apply physics, ecology, and Hawaiian values to real-world challenges.

Duration: To Be Determined
Settings: Classroom, Field Sites, and On the Ocean
Format: Project-Based • Interdisciplinary • Community-Engaged

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Course Goals

By the end of this course, students will be able to:

- Explain the cultural significance of the *wa‘a* (traditional Hawaiian canoe) in Hawaiian history, identity, and worldview.
- Describe the ecological relationships between forest, ocean, and people, and analyze how the shift to modern construction materials has influenced traditional perspectives.
- Apply scientific and engineering principles to the design, construction, and operation of canoes.
- Demonstrate traditional and modern canoe-related skills, such as lashing, sailing in open ocean conditions, and repairing both wooden and synthetic canoe components.

- Collaborate on a culminating project integrating traditional cultural practices with STEM learning.
- Reflect on Hawaiian worldview values and how they guide responsible interaction with the environment and community.

Detailed Unit Plan

Unit 1: Origins of the Canoe

Focus: Cultural grounding, identity, and values

Activities:

1. Review the migration of Austronesian peoples from Taiwan into the Pacific.
    - References:
        - hemakeewaa.org
        - *The Peopling of the Pacific: The Last Great Human Expansion*
        - YouTube: Austronesian Migration
2. Explore the cultural context of the Hawaiian canoe.
    - Reference: Cultural Context
3. Examine core cultural values associated with the *wa‘a*.
    - Reference: Cultural Values
4. Group Discussion:
    - Origins of the Hawaiian people
    - The importance of worldview in shaping a culture
    - How the canoe influenced the Hawaiian worldview

Unit 2: Hawaiian Canoe Design and Engineering

Focus: Design principles, hydrodynamics, and environmental adaptation
(A traditional wa‘a kaukahi—outrigger canoe—will be on display.)

Activities:

1. Identify the defining features of a Hawaiian canoe.
    - Reference: Selected Videos
2. Explore design elements:
    - Hull Design – Video
    - *‘Iako* (outrigger boom) – Video
    - *Ama* (float) – Video
    - Sail Design – Video
    - Paddle Design – Hawaiian Paddle
    - Types of Canoes – Canoe Types
3. Analyze environmental factors that influenced the design of the Hawaiian canoe.
    - Reference: Unique Design Factors
4. Investigate buoyancy and Archimedes’ Principle—why canoes float while most rocks sink.
    - Reference: Why Things Float
5. Compare the Hawaiian canoe to other Pacific Island canoes.
    - Reference: Herb Kāne Canoe Gallery
6. Memorize traditional canoe part names.
    - Reference: Canoe Part Names

7. Group Discussion:
    - How environmental conditions shaped Micronesian and Polynesian canoes differently
    - Differences among Tahitian, Samoan, Marquesan, Tongan, and Hawaiian canoes
    - How and why modern outrigger racing canoes differ from traditional Hawaiian designs

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Unit 3: Hawaiian Canoe Construction

Focus: Traditional craftsmanship, structural design, and modern innovations
(A wa'a kaukahi will be used for demonstration and practice.)

Activities:

1. Study the traditional tree selection process and the rituals associated with canoe construction.
    - References:
        - Canoe Construction
        - Selecting a Tree
2. Review the traditional hull construction process as described by David Malo and Abraham Fornander.
3. Examine traditional tools used in canoe construction.
    - Reference https://www.hemakeewaa.org/traditional-tools
4. Explore modern materials used in canoe construction.
    - Video: Modern Canoe Building
5. Study modern OC-6 canoes.
    - Reference: Kamanu Composites – Elepaio
6. Discuss the differences between traditional Hawaiian canoes and modern OC designs.

7. Review traditional canoe part names.
    - Reference: Canoe Part Names

Unit 4: Canoe Lashings

Focus: Traditional lashing methods and practical application

Activities:

1. Learn traditional canoe lashings (*kua‘iako*, *lanalana*).
    - Reference: Lashing Techniques
2. Study traditional lashing fibers—methods of preparation, tensile strength, friction, and torque.
    - Reference: Hawaiian Materials
3. Practice lashing the *‘iako* to the *wae* and *‘iako* to the *ama* on an actual canoe.

Unit 5: The Canoe and the Forest

Focus: Native forest ecology and the canoe’s natural origins
(Field Trip)

Activities:

1. Explore how the canoe begins in the forest—review plants traditionally used in canoe construction.
    - Reference: Forest Connection
2. Review the checklist for selecting a solid koa log.
    - Reference: Selecting a Tree
3. Investigate threats to native forests and the impact of invasive species.

    - Reference: Pacific RISA – Hawaiian Forests

4. Field Trip: Visit a native forest to identify canoe-building plants.

Unit 6: The Canoe and the Ocean

Focus: The relationship between the canoe, the ocean, and Hawaiian worldview
(Field Trip)

Activities:

1. Examine the Hawaiian worldview of the ocean.
    - Reference: Canoe and the Ocean
2. Study how ocean swells form and influence voyaging.
3. Practice coastal navigation and identifying natural waypoints.
4. Analyze how wind affects the ocean surface.
    - Reference: Wind and Waves
5. Learn the art of surfing a Hawaiian canoe.
    - Reference: Pāka – Canoe Surfing
6. Practice righting an overturned canoe (*huli*).
    - Reference: Huli – Overturned Canoe
7. Learn steering techniques (*hoʻokele*).
    - Reference: Steering a Canoe
8. Field Experience: Steer, right, and navigate a canoe on the ocean using coastal waypoints.

Unit 7: *Hoe ʻAna* – Hawaiian Paddles and Paddling

Focus: History, design, and technique of traditional Hawaiian paddling
(Field Trip)

Activities:

1. Examine the traditional shape and design of the Hawaiian paddle.
2. Learn traditional paddling methods.
3. Explore the evolution of paddle shapes and paddling techniques.
    - Reference: Hawaiian Paddle
4. Practice paddling a single-hull canoe on the ocean.

Unit 8: Sailing a Hawaiian Canoe

Focus: Design and function of the traditional Hawaiian sail and sailing methods
(Field Trip)

Activities:

1. Explore how sails work and the physics of wind propulsion.
    - Reference: How Sails Work (PDF)
2. Review the construction of the traditional Hawaiian sail.
    - Reference: Hawaiian Sail
3. Learn Hawaiian terminology for sails and rigging.
    - Reference: Hawaiian Sail
4. Understand crew roles, seat positions, and responsibilities.
5. Sail a Hawaiian canoe rigged with a traditional Hawaiian-style sail.

Unit 9: Capstone and Reflection

Focus: Planning and completing a coastal voyage

Activities:

1. Plan provisions—food and water—for a coastal journey.
2. Map and design a complete sailing plan.
3. Monitor weather conditions and interpret forecasts.
4. Rig canoes and load supplies (weight and balance).
5. Launch and sail according to the plan.
6. Reflect on the voyage experience and personal growth in understanding culture, science, and connection