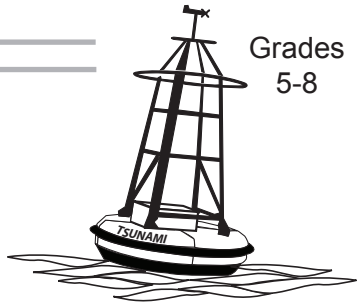
Built for Waves



Grades 5-8

Overview:

In this lesson students explore key design elements of traditional kayaks of the Aleutian Arc and their adaptations for traveling through ocean waves with speed. NOTE: No one should ever go on a boat intentionally during a tsunami.

Targeted Alaska Grade Level Expectations:

Science

[7] SF1.1-SF3.1 The student demonstrates an understanding of the dynamic relationships among scientific, cultural, social, and personal perspectives by investigating the basis of local knowledge (e.g., describing and predicting weather) and sharing that information.

Math

[5] PS-5 The student demonstrates the ability to apply mathematical skills and processes across the content strands by using real-world contexts such as social studies, friends and school (M10.2.1 & M10.2.2)

[6] PS-5 The student demonstrates the ability to apply mathematical skills and processes across the content strands by using real-world contexts such as social studies, friends, school and community (M10.2.1 & M10.2.2 & M10.3.2)

Targeted Alaska Cultural Standards:

B2 Culturally-knowledgeable students are well grounded in the cultural heritage and traditions of their community. Students who meet this cultural standard are able to make effective use of the knowledge, skills, and ways of knowing from their own cultural traditions to learn about the larger world in which they live.

Objectives:

The student will:

- explore the parts of a traditional kayak that were designed for improved travel through waves;
- create a model *qayaq* or *iqyax̂*; and
- use traditional measurements to sketch a qayaq.

Materials:

- Internet access
- Colored pencils
- Scissors
- Clear tape
- Butcher paper
- String
- STUDENT WORKSHEET: "*Qayaq* or *Iqyax̂*" copied onto cardstock
- STUDENT WORKSHEET: "Built for Waves"

Whole Picture:

The traditional names for the kayak are *qayaq* in Sugt'stun, the Alutiiq language, and *iqyax̂* in Unangam Tunuu, the language of the Unangan/s. Another common term for kayak is *baidarka*, of Ukrainian origin.

> "It seems to me that the Aleut baidarka is so perfect in its way that a mathematician himself could hardly add anything to the perfection of its sea going qualities (Veniaminov 1840: 222)."

The indigenous peoples of the Aleutian Arc held intimate knowledge of the sea. This knowledge helped them understand when and where to travel as well as how to travel across the sea. The impact of waves on an ocean-going craft, and the need for speed when hunting, influenced kayak design of the Alutiit and Unangan/s.

Key design elements of the Alutiiq and Unangax̂ kayaks:
Parts of the frame are lashed together. Nails or screws are not used. In his ethnographic notes, Father Ivan E. Veniaminov described the use of bone and flexibility in the wooden frame:

> In the best one-hatched baidarka, in order to give them speed, they inserted as many as 60 small bones in all the joints, the bones were used as plugs, the end of the axis, the locks, plates, etc. When such a baidarka was in motion, almost every part was in movement… The keel is always in three pieces in order that the baidarka may have movement when on the run or, as they say, that it may "bend" over the wave.

G.H. von Langsdorff, a naturalist, also commented on the use of bone to protect from the shock of waves.

> In some places, where the different pieces of the skeleton are fastened together, two flat bones are bound cross-ways over the joint in the inside and this the chief assured me was of the greatest use in stormy weather. As the fastenings are apt to be loosened by the shock of the waves, these bones contribute essentially towards preventing such an inconvenience; but this art is not known to all, and is kept very much a secret by those who possess it. (Langsdorff, 1814)

A sheathing of sea lion or seal skin contained the flexible frame of the boat.

Alutiiq boatbuilder, Nick Tanape Sr. of Nanwalek commented that the bifid, or bifurcated, bow allowed the bottom portion to cut through a wave as the top section provided the boat with a planing surface.

> It helps when you're out there in the rough water. It definitely works. I don't know whose idea it was, but you would have to be very smart to figure that out. They traveled in very rough seas out here. I've been in a boat where a forty- or fifty-foot boat couldn't travel where our people traveled in their fifteen- to sixteen-foot kayaks. (Steinbright, 2001)

Activity Preparation:

Follow the directions on STUDENT WORKSHEET: "*Qayaq* or *Iqyax̂*" to make a model.

Activity Procedure:

1. Explain that students will learn how the Alutiiq and Unangan/s developed an important tool that was made to travel fast across ocean waves, the kayak. Explain the local traditional terms for the kayak, *qayaq* in Sugt'stun, the Alutiiq language, and *iqyax̂* in Unangam Tunuu, the language of the Unangan/s. Encourage the use of the local term throughout the lesson in place of "kayak."
2. To view traditional kayaks, access Alaska's Digital Archive at http://vilda.alaska.edu. Enter a search term of "kayak." Two images showing kayaks of Alutiiq and Unangax̂ style include "Aleut in a *qajaq* (kayak) off the coast of St. Paul" and "Canoes of Oonalashka." Use the information from the *Whole Picture* section and the model kayak to describe key design elements for waves. Other features to point out using the images include the use of single-blade and double blade paddles, as well as the use of one, two, or three hatches in a kayak.

3. Distribute colored pencils, clear tape, scissors and STUDENT WORKSHEET: "*Qayaq* or *Iqyax̂*" copied onto cardstock to each student. Instruct students to color then assemble their own model *qayaq* or *iqyax̂*.
4. Distribute STUDENT WORKSHEET: "Built for Waves." Explain that students will need to answer question one then complete the second part of the worksheet as part of a group. Distribute lengths of string (about arm-span length) to each group along with a large strip of butcher paper. Each group should pick one person to be the source of measurement.

Extension Ideas:

- If there are traditional kayaks in your community, take a field trip to go investigate one. Compare the craft to other boats.
- Invite an Elder or traditional boat builder to talk to about the kayak or other boats and how they are made.

Answers:

STUDENT WORKSHEET: Built for Waves

1. Description of how the design elements are made for traveling over ocean waves.
2. Answers will vary.

Lesson Information Sources:

Alaska's Digital Archive. http://vilda.alaska.edu

Birket-Smith, K. (1953). *The Chugach Eskimo*. Kobenhavn: Nationalmuseets publikationsfond.

Brinck, W. (1995). *The Aleutian Kayak: Origins, Construction, and use of the Traditional Seagoin Baidarka*. Camden, Me: Ragged Mountain Press.

Dyson, G. (1990). *Baidarka*: The Kayak. Anchorage: Alaska Northwest Books.

Langsdorff, G.H.V. (1813). *Voyages and Travels in Various Parts of the World during the Years 1803, 1804, 1805, 1806, and 1807*. London: H. Colburn; [etc.].

Steinbright, J., and Mishler, C. (2001). *Qayaqs and Canoes: Native Ways of Knowing*. Anchorage, Alaska: Alaska Native Heritage Center.

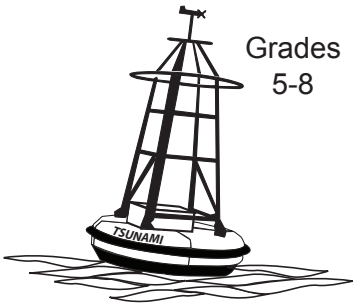
Veniaminov, I. (1840). *Notes on the Islands of the Unalashka District*, translated by L. Black and R.H. Geoghegan, R.A. Pierce (ed.), 1984, Limestone Press, Kingston, Ontario.

Zimmerly, D.W. (2000). *QAYAQ: Kayaks of Alaska and Siberia*. Fairbanks, Alaska: University of Alaska Press.

Qayaq or *Iqyax̂*

Student Worksheet

Grades 5-8



Directions:

1. Color your boat.
2. Cut on solid line.
3. Fold on dotted lines.
4. Tape the tip of the bow together.
5. Tape the tip of the stern together.
6. Fold and tuck shaded tabs into the boat and apply tape to secure.

Name:_____

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Student Worksheet

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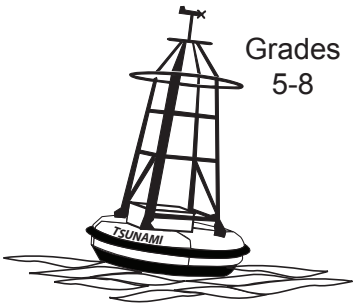

1. Describe how the *qayaq* or *iqyaχ* was designed to travel with speed through the waves.

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2. The *qayaq* or *iqyaχ* was an important tool. The hunters who used them were strongly connected to their boats in many ways. They had to take great care to make sure that the boat would last. They were also physically connected to the boats through their *kamleikas*, gut-skinned jackets, to keep water out of their boats. Finally, their boats were made using the dimensions of their own bodies. To get a sense of how this worked, use the description below to draw a model on butcher paper. Black Stepan Britskalov of Chenega described these measurements for a three-hatch qayaq in 1933 as told to Kaj Birket-Smith and Frederica de Laguna (1953).
   - Length of gunwhale: three arm spans plus one lower arm and a hand plus one hand with outstretched fingers. (gunwhale: the upper edge of a boat's side)
   - Width of the middle: one arm including the hand.
   - Length from stem piece to the first hatch: one arm span.
   - Diameter of the first hatch: one lower arm plus the hand.
   - Distance between the rims of the first and third hatch: one arm span plus three finger widths plus one hand with outstretched thumb.
   - Distance from the edge of the third hatch to stern: one arm span with the right fist flossed.