

Yaakwx'

Canoes

Grade Level 2-3



Tlingit Cultural Significance

Southeast Alaska is made up of many miles of coastline and hundreds of islands, with a wide variety of resources and villages scattered throughout. Canoes were the primary mode of transportation used by the people of Southeast Alaska for hundreds of years. Tlingit people use canoes and other watercraft to support their coastal lifestyle, to gather resources, and for basic transportation. Canoes were used for hunting, fishing, gathering and traveling between villages to trade or take part in a traditional party — a *Koo.éex'*. Canoes vary greatly depending on their function.

The process of canoe building requires much skill, and often the canoes themselves would be used as trade items between tribal nations. A carver with great skills could bring wealth and prestige to a clan and village. Today traditional canoes are still used in a variety of traditional and recreational ways. Canoes represent unity and teamwork, strength training and health, as well as being a sophisticated art form and symbol of cultural identity.

Elder/Culture Bearer Role

Elders enrich this unit with their cultural knowledge in the areas of:

- Storytelling, as the Elder shares the legend of *Naatsilanéi*
- Lingít language—names of trees in Lingít, types of canoes in Lingít
- Cultural values, as the Elder shares knowledge of canoes.

Overview

In this unit students learn what makes objects move and understand how they move. Central understandings include the concepts of friction, gravity, force, and the movement of sound waves.

In **Lesson #1** students listen to and respond to the traditional Tlingit story, *Naatsilanéi* while learning the wisdom of Tlingit ancestors as they worked with various types of wood. After using various woods of different densities, and learning that some woods float higher than others, students better understand how scientists experiment.

A series of elementary level thematic units featuring Tlingit language, culture and history were developed in Juneau, Alaska in 2004-6. The project was funded by two grants from the U.S. Department of Education, awarded to the Sealaska Heritage Institute (Boosting Academic Achievement: Tlingit Language Immersion Program, grant #92-0081844) and the Juneau School District (Building on Excellence, grant #S356AD30001).

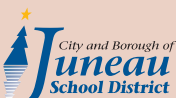
Lessons and units were written by a team of teachers and specialists led by Nancy Douglas, Elementary Cultural Curriculum Coordinator, Juneau School District. The team included Juneau teachers Kitty Eddy, Shgen George, Kathy Nielson, Hans Chester and Rocky Eddy, and SHI language team members Linda Belarde, Yarrow Vaara, David Katzeek, John Marks, Mary Foletti, Rose Natkong and Jessica Chester. Curriculum consultants Julie Folta and Toni Mallott assisted and Annie Calkins edited the lessons and units.

Lessons were field tested in Juneau classrooms in 2005-6.

All units are available online at sealaskaheritage.org.



Sealaska Heritage Institute





In **Lesson #2** students learn to identify the parts of a canoe, examine the process of constructing a Tlingit canoe, and learn to identify different types of canoes and their uses.

In **Lesson #3** students learn about friction by pushing a large box that simulates a canoe. The tests are done on different surfaces such as a rug, gravel and concrete. The streamlined shape of a canoe is designed to reduce the friction of the water against the canoe and reduce the amount of force required to move it.

In **Lesson #4** students learn about force as a push. They explore paddles and how paddles are designed as a lever to create the most force with the least amount of effort. Students learn about the forces of nature such as the wind. Sails attached to canoes utilize this natural force as a push in traveling long distances.

In **Lesson #5** students learn about the concept of work and force as a pull related to the use of fishing nets. More force is required to move heavier loads (full nets) than lighter loads. The concept of friction is reinforced.

In **Lesson #6** students learn that sound is produced by things that vibrate. Things that vibrate faster produce higher pitched sounds and things that vibrate slower produce sounds that are lower in pitch. Students also learn a canoeing song, and are introduced to a traditional greeting ceremony.

In **Lesson #7** students participate in a canoeing, drumming field trip in which they learn to apply the concepts learned in previous lessons.

Alaska State Standards

English/Language Arts

D2) Evaluate the validity, objectivity, reliability, and quality of information read, heard, and seen

Science

A5) Understand strength and effects of forces of nature

A6) Understand that forces of nature cause different types of motion and describe the relationship between these forces and motion

A8) Understand scientific facts, concepts, principles, and theories
b. state that whenever energy is reduced in one place, it is increased somewhere else by the same amount

B1) Use the process of science, including observing, classifying, measuring, interpreting data, inferring, controlling variables, developing models and theories, hypothesizing, predicting, and experimenting

B2) Design and conduct scientific investigations using appropriate instruments

C3) Understand that society, culture, history and environment affect the development of scientific knowledge

D1) Apply scientific knowledge and skills to understand issues and everyday events



Math

- A1) Understand and use numeration, including
 - a. numbers, number systems, counting numbers, whole numbers, integers, fractions, decimals, and percents
- A2) Select and use appropriate systems, units, and tools of measurement, including estimation
- A3) Perform basic arithmetic functions, make reasoned estimates, and select and use appropriate methods or tools for computation or estimation including mental arithmetic, paper and pencil
- A4) Represent, analyze, and use mathematical patterns, relations, and functions using methods such as tables, equations, and graphs
- A6) Collect, organize, analyze and use mathematical patterns, relations, and functions using methods such as tables, equations, and graphs

Cultural Standards

- A3) Acquire and pass on the traditions of community through oral and written history
- D1) Acquire in-depth cultural knowledge through active participation and meaningful interaction with Elders

Lesson #1

Naatsilanéi, a scientist

Objectives

Students:

- Understand that Tlingit stories teach important lessons
- Identify scientific behavior and understand the process of experimentation
- Understand the properties of buoyancy of different types of wood
- Learn what type of wood is used to make Tlingit canoes.

Time

3-4 hours

Materials

- Written, Audio or Video Story of *Naatsilanéi*
- Pictures / drawings of trees labeled in Lingít and English
- Pocket chart cards of target vocabulary and phrase patterns
- Tub of water
- Pieces of wood - same size and shape - of tree types mentioned in the story; alder, red cedar, yellow cedar, spruce and other woods - (Ask your lumber supply company or shop teacher)
- Objects for sinking/floating experiments, colored math tiles
- Wall chart paper for creating posters



Vocabulary

Lingít:

aasx'
shéiyi
yán
xáay
laax
keishísh
káas

English:

trees
 spruce
 hemlock
 yellow cedar
 red cedar
 alder (beach)
 wood (stick of wood)

Lingít Phrases

Insert target vocabulary above into phrase positions marked by ().

() *gé iyatéen?*
Daa sá iyatéen?
 (Xáay) *xaatéen.*

Do you see ()?
 What do you see?
 I see (yellow cedar).

() *gé at wulhaash?*
 () *at nalhaashch*

Does () float?
 () floats.

() *gé yoo ya taa x'w?*
Yoo yataax' w.

Does () sink?
 It sinks.

Teacher Background Information

Types of trees

Shéiyi - Spruce: These trees can stand about 70 m tall and 2 m in diameter. The bark is scaly with brown and grayish colors. The leaves are yellowish-green or bluish-green in color with sharp pine needles that are stiff and droop. Brownish-red round pine cones 5-8 cm long hang from the ends of leaves. The pine needles have seeds and have a scaly texture. You will know it's a spruce tree when you grab the leaves and it hurts. Spruce trees traditionally provide pitch-medicine when mixed with devils club. It is also used as a fire starter; roots are used for weaving baskets and hats; new-growth of the budding spruce tips can be used for tea or jelly.

Laax - Red Cedar: Red Cedar trees average about 60 m tall or more. These trees can get fairly large with vertical strands of bark that are grey to reddish brown in color. Strips of bark can tear off with a fibrous look. The flat showering branches have a slightly droopy look that turns upward. The leaves have a glossy overlapping scale texture that is yellowish green and turns brown. Small reddish oval cones with very few scales and about 1 cm. long sprout on the leaves. At the beginning of the sprouting, the cones are green and turn brown with a wood texture and sprout upwards like a flower. Red cedar is traditionally used to weave, carve and make canoes.



Xáay - Yellow Cedar: These trees stand about 50 m tall with a dirty white to grayish brown bark having a twisted trunk. The bark has a shredded, peeling look to it. The leaves droop and have a slightly smooth scaly look that are bluish-green and are about 3-6 mm long. The tips are sharp pointed and spread out. The cones are about 4 mm long and start out with a berry look that is bumpy and grow to a brownish cone with scales shaped like a mushroom. It is traditionally used for carving, making canoes, and weaving.

Yán - Hemlock: This tree averages about 60 m tall and has a narrow look to it. The reddish-brown bark has a scaly rough look. The leaves look like spruce tree leaves but are flatter without the sharpness at the tips. The yellow-greenish leaves have needles with a rounded tip that average about 5-20 mm long. The oblong cones are about 2 cm long, are first purplish-green and as they mature, then turn light brown. Traditional use is mainly to collect herring roe.

Keishish - Alder: Alder wood trees are about 25m tall and have thin, smooth grey bark with patches of white lichen. Green moss will grow on the bark as well. The leaves are about 5-15 cm. long, broad and elliptic with a sharp tip. The leaves are also green and have a rustic, hairy look underneath the leaf. Brown, long clusters of cones about 2 cm. long will grow on the leaves (even through the winter).

Activities

Activity #1

Read, tell or watch *Naatsilanéi* legend

1. Before reading/telling/watching the story, ask students if they know the legend of *Naatsilanéi*. Ask them to tell you what they know. Let students know that at one point in the legend *Naatsilanéi* needed to act like a scientist, he experimented with three types of wood to determine which had the most desirable characteristics. Ask students to tell you what scientists do; record this on a chart. Tell students they are to listen to the story and see if they can find the point at which *Naatsilanéi* acted as a scientist.
2. Read, tell or watch a video of the legend. Elder role: Tell the story. Ask students to tell you what *Naatsilanéi* did that showed he was a scientist. Circle the words on the chart previously made...(something like...scientists experiment; scientists try something and if it doesn't work, they try something else; scientists discover new things).

Activity #2

Lingít Lesson

1. Show tree wall cards with the Lingít names and practice saying both the English and Lingít names.



Shéiyi
Spruce

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Yán
Hemlock

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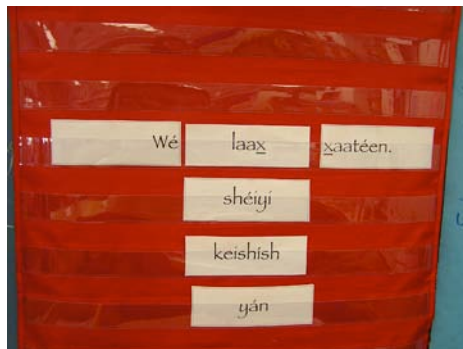


Yán
Hemlock

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- Tree Sentence Pattern Wall Cards: Using a pocket chart with the stem phrase, “Wé () xaatéen”, students create and read/recite sentences using Lingít words *keishish / laax / shéiyi/ yán*.



Daa sá iyatéen?
Wé (xáay) xaatéen.
(Xáay) gé iyatéen?
Xáay

What do you see?
 I see (yellow cedar).
 Do you see (yellow cedar)?
 Yellow cedar

- Create a book “Wé aasx’ xaatéen – I see the trees” showing different types of trees labeled correctly with Lingít phrases.

Wé aasx’ xaatéen.



Wé shéiyi xaatéen.



Wé yán xaatéen.



Wé xaay xaatéen.

Activity #3 Looking at tree types from the story

- Discuss how different trees have different types of needles/leaves, bark, cones, and overall shape.
- Take a walking field trip to look at types of trees: Go and look at real red cedar, hemlock, spruce and alder trees.
- Take samples of fallen branches to bring back to the classroom. Remind students that it would not be respectful to cut off branches for this use but that there are times when branches are taken from living trees with respect.

*If possible, use Total Physical Response instruction during the field trip as students gather branches:

Ax’ yei nastí wé () t’áni. Pick up the () branch.



4. Discuss observations of trees and make body movements to help remember the characteristics of each tree. Use TPR instructions to demonstrate to students how to act like different trees.

a. **Alder:** flat leaves smooth bark
*TPR instruction: *t'áal' i jín* flat hands



b. **Spruce:** stiff branches, pokey needles, rough bark
*TPR instructions: *shigeel' i t'ei_k* stiff fingers
t'ei_k luyex'aan pointy fingers



c. **Hemlock:** not as stiff branches, slightly pokey needles
*TPR instructions: *tléil shigeel' i t'ei_k* not stiff fingers
tléil t'ei_k luyex'aan not pointy fingers



d. **Spruce:** droopy branches, soft flat needles
*TPR instructions: *jínlileil ka daalileil* droopy hands and body
kashix'wál'san jint'áal' soft flat hands





- Using the branches of red cedar, spruce, hemlock and alder trees students do sketches, paying close attention to the details of the different branches.



- With students, create a 4 column chart, similar to the one below, noting their observations.
Elder role: comment on how parts of the different trees were used traditionally.

	<i>Laax</i> Red Cedar	<i>Keishish</i> Alder	<i>Shéiyi</i> Spruce	<i>Yán</i> Hemlock
Bark	Paper like	Smooth	Rough	Rough
Needles	Flat, soft, flexible	Leaves are sticky on back	Hard, sharp, stiff	Little sharp, little stiff
Uses	Bark- weaving, wood – carving	Used as firewood in smokehouse	Roots - weaving	Branches- to gather herring eggs

Activity #4 Lingít Lesson

Use Wall Chart cards and pocket chart cards to teach the Lingít words and phrases related to floating and sinking. Use reduced size wall chart cards to play a matching game.

Activity #5 Naatsilanéi's experiments with wood

- Students classify objects on a T-chart labeled in English and Lingít similar to the following example:

<i>Át nalhaashch</i> (it floats)	<i>Á yoo ya taax'w</i> (it sinks)
-------------------------------------	--------------------------------------

- Part 2: Using red cedar, yellow cedar, spruce and alder as well as other woods, students conduct sinking and floating experiments. Since most woods will float, students will be looking at the buoyancy of the woods- how high or low they float in the water. (Some exotic, very dense woods will float lower in the water, so obtaining some of this type of wood might be useful.)



3. Discuss the concept of “rating” floating, better floaters will earn a higher rating: 4, poor floaters will earn a lower rating: 1.
4. Have students record their information on “Wood Floatation Experiment” form. Each group tests 4 types of wood. First predict which woods will be better floaters and then observe the wood floating. Students then rate all four pieces with 4, 3, 2, and 1 ratings.
5. In a group using the information collected, make a class chart and rate the “best floater to the worst floater”.



6. Part 3: Since canoes not only float, but also carry weight, predict which types of wood will hold the most weight. Students can decide what to use to test for carrying a load. Math pattern tiles work well. Have an exploration period where students can see what the best ways are to load the tiles on the wood samples. Discussions on balance should take place during exploration.



Conduct “load” part of experiment. Check to see how many tiles each type of wood can hold before it sinks.

7. After the experiments discuss which types of wood make the best to make a canoe. What qualities of the wood are good for different purposes?



Assessment

Students tell how *Naatsilanéi* thought like a scientist. They also rate pictures of floating wood according to how they rest in the water.

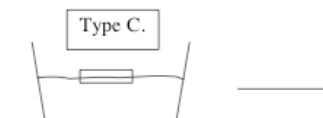
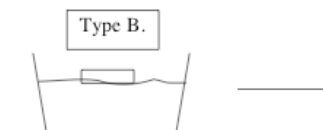
Have students fill in the blank version of “*Wé aasx’ xaatéen* – I see the trees”, correctly identifying and labeling the pictures of trees.

Name _____ Date _____

What did Naasaklene learn? _____

What did Naasaklene do to think like a scientist?

Rate each type of wood: 4 - best floater 1 - worst float



Resources included with this lesson

- Story of *Naatsilanéi*
- Audio of *Naatsilanéi*
- Pictures/drawings of various tree types
- Book “*Wé aasx’ xaatéen* – I see the trees” for students to read which includes various tree types with Tlingit phrases describing the trees. This could also be used without text, so students could write their own sentences
- Experiment form: “Wood Floatation Experiment”
- Word wall and student size/phrase cards for Lingít vocabulary/phrases
- Pocket chart words and phrases in Lingít
- Audio CD of Lingít words and phrases
- Interactive CD of Lingít Language Activities
- Felt board pieces for retelling *Naatsilanéi*
- Calendar and date pieces of *Kéet* – killer whale and *Káa* – man for patterning throughout the unit.



Optional Extension Activities:

- Invite a carver to the classroom. Ask him or her to talk about and show different types of wood, why they use specific types for specific purposes and the difference between green and cured woods.
- Write a thank you letter to the carver, Elder or other classroom visitors.
- Write and illustrate your favorite part of *Naatsilanéi* legend.
- Students read *Naatsilanéi* independently.
- Students retell *Naatsilanéi* in their own words to a partner or to a tape recorder.
- Write a script and create a puppet play for *Naatsilanéi*.
- Use felt board pieces included in Resources to retell the story to a partner.
- Watch the film “The Whale Rider” from New Zealand. Compare and contrast it with the story of *Naatsilanéi*.
- Play concentration (memory) with various pictures of different types of trees. Using Total Physical Response (TPR) instructions like the ones below, ask students to touch or point to the pictures to identify types of trees.

Kindei gaylasháat we () yahaayí.

() at chéix’

() at shi.

Xáay

Laax

Keishísh

Shéiyi

Yán

Hold up the picture of ____.

Point to the ().

Touch the ().

Yellow cedar.

Red cedar.

Alder.

Spruce.

Hemlock.

Lesson #2 Canoe Design

Objectives

Students:

- Learn to identify the parts of a canoe
- Learn to identify five types of canoes and their uses
- Become familiar with the process of constructing a canoe
- Understand that Tlingit people are methodical in their canoe design

Time

4-5 hours

Materials

- Historical pictures of Tlingit canoes
- Pictures of other water craft
- Drawings of different styles of Tlingit canoes
- Pocket chart cards of target vocabulary and phrase patterns
- Pictures of Hoonah Canoe Carving Project
- Diagram of canoe parts



Lingít Phrases

<i>Yakwtlénx' ákyá?</i>	Is this a large canoe?
<i>Goosú wé a géek?</i>	Where is the stern?
<i>Xáa kayáagu ligéi.</i>	A warriors canoe is big.
<i>Ligéi gé yáxwch'i yaakw?</i>	Is a sea otter canoe big?
<i>Ch'iyaaash yéi googéink'.</i>	A flat bottom canoe is small.
<i>Seet gé yéi googéink'?</i>	Is a pointed prow canoe small?

Teacher Background Information

Tlingit canoes require great skill to create. The tree is selected for special qualities and honored with a ceremony of respect before being cut. The canoe may often be roughed out near where the tree had grown before being moved to a more convenient location to be finished. The creation of a canoe takes a lot of time, patience, special tools, and skills. A master canoe carver holds a unique position in Tlingit society. Often a well made canoe could support a whole clan or village. Canoes vary greatly depending on the region, available materials and the desired function.

ch'iyaaash flat bottom canoe
This is a Yakutat style canoe and is generally made of spruce. It has a forked prow for warding off icebergs. It is used for hunting in rough open water, and is small and light.

yáxwch'i yaakw sea otter canoe
This small, heavy canoe is used for hunting and fishing particularly in the Stikine area of the Southern Tlingit. It has a symmetrical shape at the bow and stern and is made of spruce or cedar.

seet small canoe with pointed prow
This type of canoe is generally made of spruce and used for many general uses. Some have a sail attached. This type of canoe is treated with a black paste and crossbars and sewn in with spruce root to strengthen the sides.

duk yaakw cottonwood canoe
This type of canoe is made of cottonwood and used for river travel and fishing by the Chilkat people.

Xáa yeeyaagú war canoe
Carved of cedar, these canoes can be quite large, some carrying up to 60 people. They are used for long voyages, trade, hunting and transporting freight. They often had a carved prow representing a clan crest. Many of the finest of these were traded with the Haida.

loon yaakw bark canoe
Used in Teslin, this canoe style is probably borrowed from the Athabaskan people.

ch'akúx skin canoe
Made of caribou or reindeer skins, this canoe style is probably borrowed from the Athabaskan or Eyak people.



Activity #1 Learning canoe words

1. Study the terms of the parts of a canoe in Lingít and English. Use the pocket chart cards and phrase patterns to visually reinforce new vocabulary.

() ákyá?	Is this a ()?
yaakw	canoe
axáa	paddle
a xées'i	bow
a géek	stern
a ka.aasí	mast
yaakw yik s'ísayi	canoe sail
yéek	seat
tíx'	rope/line

Activity #2 Labeling pictures of canoe parts

Give students canoe parts diagram and have them fill in the blanks of each part of a canoe. Put up poster sized diagram for students to reference as they work.

Activity #3 Comparing canoe types

1. Refer back to tree uses. Reinforce that cedar trees are used to make canoes.
2. Watch video "Qayaqs and Canoes". Watch either the entire video or just the segment of "Making a Canoe" with Wayne Price.
3. Look at and post photos of canoe carving project in Hoonah. Compare and contrast to the video.
4. Discuss characteristics a tree would have in order to be good for a canoe: tall, straight, not too many branches, floating wood like the orca from *Naatsilanéi* story.
5. Look at historical photos of Tlingit canoes.



Jack Adams' racing canoe, Portage Bay, Seattle, 1909

In 1909, Jack Adams, a member of the Suquamish Tribe, built a canoe. Seattle's Alaska Salmon-Pacific Department. He built the canoe from a single 45-foot log. On September 6, the canoe raced in Portage Bay. In this photo, Adams and ten other men paddle the canoe in Portage Bay.



Dugout canoe with two sails, ca. 1900



Canoes near village, Vancouver Island, British Columbia, ca. 1901.



6. Each student sorts their own photos of canoes into different groups based on characteristics the students choose.



7. Students label their sorts with sticky notes; with sails, without sails, large, small, fishing, with designs, without designs, ect.
8. Use student sticky notes to make a large class chart. Each student takes a turn to put their notes on the chart, choosing which notes form a group. After all the notes are posted, label the groups and select a characteristic of each group: size, use, place (in water, on the beach), looks (design, no design), shape (high prow, flat prow, carved prow), sails.



9. Students make their pictures into a book by stapling all pages and the cover together in the order decided.
 1. Show different pictures of canoes one at a time. Students use a pocket chart to create the phrase: "I see (___)" Filling in with different canoe vocabulary.
 2. Post Tlingit canoe vocabulary cards in the room and practice daily, possibly during a morning meeting.



yakwtlénx'
large canoe



yakwyádi
small canoe



yaakw
canoe



Activity #4 Paper canoe with designs

As a class, look at pictures of canoes with designs. Discuss the possible meaning of the designs.

Give each student a copy of the paper canoe page and show an example of a completed paper canoe.

Show students where to draw a design on the canoe pattern. After a period of time they can create their own designs. Ask students to share their design with a partner and comment about what is unique about each design.

Have students cut out the canoe patterns and use small pieces of clear tape to connect the prow and stern to form the canoe.

Activity #5 Phrases

Using Lingít vocabulary cards, model questions and answers about various canoes in the historical photos. Lingít phrases include:

<i>Ligéi ágé?</i>	Is it big?
<i>Ligéi.</i>	I is big.
<i>() ligéi.</i>	() is big.
<i>() ligéi gé?</i>	Is () big?
<i>Yéi gushigeink</i>	It is small.
<i>Yéi gushigéink' ágé?</i>	Is it small?
<i>() yéi gushigéink'.</i>	() is small.
<i>() yéi gushigéink' gé?</i>	Is () small?

Assessment

Using the wall cards, students point out the parts of a canoe and discuss one feature that describes the canoe; it has a sail, it is big, it has a raven design, etc.

Resources included with this lesson

- Diagram of canoe parts
- Diagram of canoe parts worksheet
- Historical pictures of Tlingit canoes
- Pictures of other water going craft
- Paper model canoes
- Canoes Book
- Word/ phrase cards for Lingít vocabulary/phrases
- Pocket chart words and phrases in Lingít
- Audio CD of Lingít words and phrases

Additional Optional Activities

- Invite a local canoe carver to describe the process of canoe construction.
- Look at specialized tools for canoe construction; discuss the concept of a lever to increase the force applied by a tool.
- Have students identify areas on a map where specific canoe types originated.



Lesson #3

Friction at Work in Tlingit Canoes

Objectives

Students:

- Understand that push is one type of force on an object
- Understand that different surfaces create different amounts of friction
- Understand the concept of friction as it relates to the shape of a canoe

Time

3-5 hours

Materials

- Drawing, diorama or poster showing canoes on beach, including trees, rocks, bushes etc.
- Friction Experiment Worksheet
- Large box or other object to simulate canoe
- Measuring tape
- Timers
- Graph (Poster, wall size)
- Cooking oil
- Log rollers for simulated canoes
- Tub/pool of water
- “Sculpy” clay (or similar that can be oven baked)

Lingít Phrases

Wé yáakw yasátk.

The canoe is fast.

Wé yáakw gé yasátk?

Is the canoe fast?

Wé yáakw tléil usátk.

The canoe is not fast.

Wé yáakw tléil usátk gé?

Is the canoe not fast?

Activity #1

Friction is a force created when two objects rub against each other

1. Introduce the concept of friction by rubbing hands together to feel the heat.
2. Add oil and compare which creates more heat (friction) - hands with or without oil.
3. Rub hands on different substances (own clothing, carpet, linoleum in the halls, wall surfaces, grass).
4. Discuss the heat that is felt and which surfaces cause the most heat.
5. Discuss which surfaces are harder or easier to rub hands quickly on.



Activity #2 Lingít Lesson

1. Students point to various items on a picture of canoe environment, Read/recite sentences pattern used in Lesson #1 using Lingít words for a canoe launch environment:
 - o *Eech* – rocks
 - o *Aas* – tree
 - o *Aas gufú* – forest
 - o *Yaakw* – canoe
 - o *Éek* – beach
2. Students label picture of a canoe launch site with appropriate words and practice saying the phrase as they point to the picture.



Activity #3 Ease of motion (launching a canoe) is affected by friction

1. Discuss with the class the problems that might be encountered while trying to push (launch) a canoe down a beach to the water. Why would this be hard? What would make it harder or easier to push? Lead students to think about different beach surfaces: rocks, pebbles, sand.
2. Think back to Activity #1 and what caused more and less friction. Discuss which beach surfaces would cause more and less friction.
3. Discuss a plan about how we could simulate a canoe and what surfaces we could test for friction.
4. Using a large wooden box as a canoe, draw and cut out canoe sides from cardboard and attach to the sides of box. Use this box to simulate a canoe that students push on different surfaces as they conduct an experiment to compare ease of pushing.



5. Determine how to make the experiment fair and which variables will not change throughout the tests: number of students pushing and distance pushed.
6. Determine how to measure the ease of pushing: timing how long it takes to push a certain distance.
7. Determine which surfaces to test and the variables that will change: carpeted room floor, gym floor, outside concrete, playground gravel.
8. Make predictions about which surfaces will cause the least friction, and be easiest to push the canoe and why.
9. Conduct experiments.
10. Make a class data table, find the median time for each surface.
11. Make a graph using the median times.
12. Write a statement describing the results of the experiments.

Activity #4

Design an object (canoe) to meet specified characteristics

1. Discuss canoe shapes and why certain shapes are better for canoes and why others would not work as well, for example a flat front like the box.
2. Discuss:
 - a. Bigger surface area = more friction = harder to push
 - b. Smaller surface area = less friction = easier to push
3. In a tub of water try pushing a flat piece of cardboard through the water and then try pushing a bent piece with a forward facing V through the water.
4. Discuss which one “cuts” the water easier.
5. Use Pocket chart cards to learn Lingít vocabulary for “it is fast/not fast”.
6. Design and construct canoes from clay.
7. Float and push toy canoes in water (pool, ocean, lake, tub).

Assessment

Observe individual students during this lesson, and using a simple rubric, record how they participate in discussions. Ask students to choose a beach surface that would cause the least amount of friction when pushing a canoe and use Lesson #3 assessment page to evaluate their comprehension and understanding.

Resources included with this lesson

- Drawing showing canoe launch on beach, including trees, rocks, bushes etc.
- Friction Experiment Worksheet
- Word/ phrase cards for Lingít vocabulary/phrases
- Pocket chart words and phrases in Lingít
- Audio CD of Lingít words and phrases
- Interactive CD of Lingít Language Activities

Additional Optional Activities

1. Write a story about an adventure on a canoe or other watercraft.
2. Write “pass around stories” on canoe shaped paper where one student starts the story, passes it on to another student who continues the story. (A template is provided with resources)
3. Make a diorama of a beach environment showing a canoe launch, forest, mountain, canoe, etc.



Lesson #4

Force as a Push: Paddles and Sails

Objectives

Students:

- Explore different shapes of paddles
- Understand the concept of force as a push or a pull
- Understand the use of a lever to increase force
- Explore the concept of teamwork and cooperation to increase force
- Identify the wind as a source of natural force
- Learn how Tlingit people utilized the wind to aid them in transportation
- Conduct experiment to capture the force of the wind

Time

3-4 hours

Materials

- Copy of raven and eagle paddle designs
- Sail pattern
- Prepared cedar bark – wide strips
- Tub of water
- Electric and/or hand fans

Vocabulary

Lingít

axáa
aat'eegi
yayát'
yei kakwliyáat'
latseen
yéil
ch'áak'
yaakw s'ísayi
yaakw ka.aasí
ooxjaa
xáay daalooní

English

paddle
rudder paddle
long
short
strong
raven
eagle
sail
mast
wind
cedar bark



Phrases

Insert target vocabulary above into phrase positions marked by ().

Wé axáa ().

yayát'

yei kakwliyáat'

() axáax' yei yatee.

yéil

ch'áak'

Litseen wé axáa.

The paddle is ().

long

short

The paddle has a () on it.

raven

eagle

The paddle is strong.

Teacher Background Information

Paddling provides the push to move a canoe. Paddles can be many shapes and sizes. The rudder paddle is long and thick, and one person standing in the stern uses it to steer. Paddles for open ocean travel are longer than everyday paddles. Some paddles are designed with a sharp point that doubles as a weapon; others are designed with a strong straight end used to push. Wide paddles create more friction and thus are harder to pull.

Activities

Activity #1 Lingít Lesson

Use pictures to introduce the vocabulary. Post pictures around the room to practice with throughout the lesson.

Wé axáa yayát'.

The paddle is long.

Wé axáa yei kakwliyáat'.

The paddle is short.

() axáax' yei yatee. The paddle has a () on it.

Wé () litseen.

The () is strong.

Activity #2 Shapes of paddles

1. Use a variety of wide and narrow boards or pieces of cardboard and a tub of water to experiment with pushing through the water. Which shapes are easier to move through the water? Why do you think that is so? How wide would you make a paddle?
2. Repeat the experiment, using a variety of long and short boards or cardboard. Which ones give the most push? Why? How long would you make a paddle? Discuss the concept of a lever and that levers make work easier. How is a paddle like a lever?
3. Repeat the experiment again using a variety of paddles. How does shaping the blade affect how the paddle moves through the water? Why is it easier to move a paddle through the water than a board? How does paddling push a canoe?
4. As a class make a list of the properties of a paddle that can best propel a canoe.



Activity #3 Making paddles

1. Using a template of either a raven or eagle design students color the design and cut out the shape.
2. Using poster board, model how to make two paddle shapes, and then cut them out,
3. Staple the edges of paddle shapes together. Insert a wooden dowel through the middle between paddle shapes to provide support.
4. Glue the raven or eagle designs on one side of the paddle.



Activity #4 How to paddle

1. Use rows of chairs or a large refrigerator box to simulate a canoe. Have students line up as if they were sitting in a canoe and practice paddling together.
2. Sing the song "Row, Row, Row your Boat" in English and then in Lingít, using the paddles.

Activity #5: Design a canoe with a sail

1. Using the canoe constructed from clay in the previous lesson, create a mast and sail for the canoe.
2. Race canoes in water, using fans to simulate wind. (use a pool, ocean, lake, tub or mud puddle).

How does a sail push the canoe?

How does the force of the wind affect the speed of the canoe?

How does the shape of the sail affect the speed of the canoe?



Resources included with this lesson

- Word/ phrase cards for Lingít vocabulary/phrases
- Audio CD of Lingít words and phrases
- Sail pattern
- “Row Row row your Boat” song – in Lingít

Additional Optional Activities

1. Make mini wooden paddle necklaces using small wooden craft spoons. Draw a design on the spoon part, drill a hole in the end, string onto a necklace and add beads.
2. With the advice and modeling of an Elder or tradition bearer, make a sail out of plaited cedar bark.

Lesson 5

Force at Work with Fishing Nets

Objectives

Students:

- Understand that pull is one type of force on an object.
- Understand that greater force (pull on the net) is required to move greater loads (nets empty and full of salmon).

Time

3-5 hours

Materials

- Fisherman or fisherwoman
- Fish net line
- Simulated salmon – Salmon construction described in Activity #4, Optional Extension Activities (these will have to be made ahead of time.)

Lingít Phrases

Wé geiwú (tléil kooda.ét).

Wé geiwú (shawahéek).

Wé (geiwú) yadál.

Yadál gé wé (xáat)?

Wé (geiwú) tléil udál.

Tléil gé udál wé (geiwú)?

The net is (empty).

The net is (full).

The (net) is heavy.

Is the (salmon) heavy?

The (net) is not heavy.

Is the (net) not heavy?



Activity #1 Comparing nets

1. Using various sizes of nets, including nets with varying mesh sizes, students explore the net, orally comparing and contrasting the nets.
2. Students select one net sample, place it under drawing paper and, using the side of a crayon, make a rubbing of the net.
3. Students orally dictate, and then write a sentence about the size of the net or the mesh and/or hypothesized use of the net.



Activity #2 Lingít Lessons

1. Use appropriate Lingít vocabulary and language structures to describe the net used in the crayon rubbing.
 - *Ligéi*. – It is big.
 - *Yéi googéink'*. – It is small.

Label the rubbing with the corresponding Lingít phrase.

2. Use the Lingít vocabulary cards to learn and practice the different phrases.



Tléi udál
It's light.

Vocabulary Word Cards Use with Cane Unit, Lesson 1, Activity 2
Funded by U.S. Department of Education Alaska Native Education Funds Building on Success



Yadál
It's heavy.

Vocabulary Word Cards Use with Cane Unit, Lesson 1, Activity 2
Funded by U.S. Department of Education Alaska Native Education Funds Building on Success



3. Make the “Nets” book and practice Lingít words for nets—It’s big, it’s small, it’s heavy, and it’s light, etc.



Geiwú



Xaet



Yá googik



Yegit



Geiwú

“Nets” Book Use with Canoe Club, Lesson 4, Activity 1 & 2

Produced by U.S. Department of Education, Alaska Native Educational Needs Working Group Report

Alaska Native Education 2005-06 and 2006-07



Tai uddi



Yegit

Activity #3

Differing amounts of force are required to pull empty and full nets

1. Using a large seine net loaded with different amounts of simulated salmon (see additional activities if you need to make simulated salmon) set up an experiment to test for amount of force needed to pull in the net.
2. Determine how to make the experiment fair, which variables will not change throughout the tests: Distance pulled (15 ft.) and time to beat (under 5 seconds)
3. Determine the 4 load amounts: empty, 15 fish, 30 fish, and 60 fish.



4. Determine how to measure force needed to pull different amounts of weight:
 - a. Decide on a distance to pull a net loaded with different amounts of fish, (15 ft)
 - b. Time how long it takes 1 student to pull an empty net or zero fish (about but not over 5 seconds),
 - c. Load the net with the next smallest amount of fish (15),
 - d. Time how long it takes one child to pull the net the same distance (it should take more than the amount of time it took to pull the empty net) ,
 - e. Add one child (force) at a time until they can pull the loaded net the same distance in the same amount of time (or less) as the one student with an empty net,
 - f. Continue adding fish to create different weights, and adding students to pull the net in under the allotted time (5 sec.).



5. Make predictions about how many kids it will take to pull the different loads in the same time.
6. Conduct experiments.



7. Make a class data table.
8. Make a graph.
9. Write a statement describing the results of the experiments.

Activity #4 Lingít lesson

Use Lingít vocabulary and language structures to describe pulling the net. One student acts out pulling an empty or full net and the other students describe, in Lingít, what the net is like (charades).

Át shawahéek
Wé geiwú toot yish!
Geiwú yaa at tusayikx'.
Has du geiwú keis anayish.

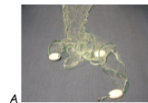
It is full
 Pull the net!
 We are pulling the net.
 They're pulling their net in.

Assessment

Assessment sheet included in Resources: When given 3 pictures of loaded nets and three pictures of students pulling nets, students match the loaded net with the number of children needed to pull that net. They write about why they made the choices they did. Students should use the vocabulary words “force” and “weight” in their writing.

Name _____ Date _____

1. Match the net with the amount of force needed to pull it.



■

■



1



■

■



2



■

■



3



Resources included with this lesson

- Pictures / drawings of nets being pulled on smooth and rough surfaces
- Pictures / drawings of nets with many, few or no fish
- Word/ phrase cards for Lingít vocabulary/phrases
- Pocket chart words and phrases in Lingít
- Audio CD of Lingít words and phrases
- Interactive CD of Lingít Language Activities

Optional Extension Activities

Making simulated salmon

Decide on what type of salmon to make and find out the average weight of that salmon. Measure and fill ziplock bags with rice or sand to the correct weight. Make paper cutouts of a salmon and staple them together to form a whole fish and put filled ziplock bags inside. A more permanent salmon may be made from cloth. Use the salmon in the nets. If nets are not available, sheets with lines drawn on them to represent a net could be used.

Making contemporary nets; net repair (time varies)

Invite a fisherman to the class with the focus of net repair. Students learn basic knots and techniques used in net repair and use them on classroom nets.

Lingít lesson

Use appropriate Lingít vocabulary and language structures to describe and then label the mesh size of the net;

It is big. *Ligéi.* It is small. *Yéi googéink'*

Making line (for fishing, nets, ropes, anchors and harpoons) from bull kelp (time varies): Using information found at http://primitiveways.com/bull_whip_kelp.html read about and, if possible, make line for fishing from bull kelp. Students learn this kelp was used by ancestors to make line and for other purposes as well, including for storage containers, to steam thin strips of wood for bentwood halibut hooks, as moulds for hot oil and as food.



Lesson #6

Sound Vibrates in Drums and Rattles

Objectives

Students:

- Understand that sound is caused by vibration
- Understand that sound vibrations are long or short and that sound (pitch) varies according to wave length
- Learn how traditional instruments (drums) produce different pitches

Time

3-4 hours

Materials

- Rubber bands
- Paper cups
- Chart paper
- Blank paper
- Tlingit drums or pictures of drums
- Heat lamp or hair dryer
- Cd of Canoe song
- Poster board
- Crayons or markers
- Glue
- Stapler and staples

Lingít Phrases

Ya gaaw (___).
 ligaaw.
 tléil oolgaaw.
Wé gaaw kawdinét.
I ya.áxch gé wé gaaw?
Kaa s'é xaa.áxch.
Goodáx aayaakw sáyá?
Dzántik'i héenidáx yaakw áyá.

This drum is (___).
 loud.
 not loud.
The drum is vibrating.
Do you hear the drum?
I hear a voice.
Where is this boat from?
This boat is from Juneau.



Activities

Activity #1

Sound is produced when objects vibrate

Conduct a series of experiments/demonstrations as follows.

1. Using 2 rubber bands, tie one so that it is smaller than the other, and stretch them around a cup to create a plucking instrument.



2. Observe each rubber band and make notes on chart paper about how they look; one is thinner/thicker than the other, one is tighter/looser than the other.
3. Carefully pluck one at a time and listen to how they sound.
4. Note on the chart paper what students observe; one is higher/lower in pitch than the other.
5. Pluck each rubber band again, this time observing the vibrations and movement of each.
6. Using a blank sheet of paper, students draw how they saw the rubber bands moving.
7. On chart paper draw two wavy lines, one with small close together waves and one with larger, wider waves, to represent the two rubber bands. Ask the students which one would make a higher pitched sound and which would make a lower pitched sound.

Activity #2

Tlingit drums

1. Show pictures of different drums or use real ones if available.





2. Ask the students which drums they think would make higher or lower pitched sounds and why.
3. If real drums are used, beat them while listening for the differences in pitch. Discuss that when a drum is warm, the skin on it tightens and this causes a tighter vibration like that of the tighter rubber band, and vice versa with a cold, loose drum. Use a heater, lamp, or hairdryer to heat up a drum and listen to the pitch get higher.
4. Use appropriate Lingít vocabulary and language structures to say, "This drum is loud, quiet, big, small" Using pictures of drums (see Resources), use appropriate Lingít vocabulary and language structures to describe a drum in Lingít. "This drum has a (raven, eagle, orca, salmon) on it".

Activity #4 Canoe song

Invite an Elder or someone who knows the canoe song to come teach the students. If this is not possible, listen to the CD with the song. Teach students the canoe song while using a drum.

Wei, wei, weiyaa hei,
Wei, wei, weiyaa hei,
Aaa aa aa aaa
Aa haa wei
ee yaa hei
Aa haa wei haa hei
Ee yaa hei yaa.aa

Activity #5 Traditional Tlingit greeting ceremony

Use Lingít phrase cards and different Southeast community names to simulate a greeting ceremony. These ceremonies were held in order to identify the origin of travelers as they approached a neighboring village.

Goodáx aayaakw sáyá?
Dzántik'i héenidáx yáakw áyá.

Where is this canoe from?
This canoe is from Juneau.



Assessment

Students use the assessment sheet (see Resources) to match a loose drum wave pattern to larger waves and a tight drum to smaller waves pattern. Students describe the sound that each one would make.

Resources included with this lesson

- Assessment sheet
- Pictures of drums
- Paddle designs
- Paddle template
- Language materials
- Word/ phrase cards for Lingit vocabulary/phrases
- Audio CD of Lingit words and phrases

Optional Extension Activities

- Make a bull kelp rattle - Make traditional rattles using the directions found at http://primitiveways.com/bull_whip_kelp.html
- Vary the items used to fill the rattles, and notice the different sounds made by these items.
- Compare and contrast different types of native drums.
- Learn to identify and draw different NW Coast designs and how to put them into a circular format.
- Make embroidery hoop mini drums using rawhide for the drum head. Paint NW Coast designs on the skin.
- Compare the different sound drums make when struck in the center, or along the edge. Hypothesize why this might be occurring.
- Discuss with a music teacher ways that she/he might integrate drums and drumming into music classes.



Lesson #7

Canoe Paddling: A Field Trip

Objectives

Students:

- Experience how the position and motion of a canoe can be changed by pushing (paddling) and pulling
- Understand how balance affects motion
- Experience how paddling together increases the amount of force, resulting in more motion

Time

3-4 hours

Materials

- Canoes
- Paddles
- Life jackets
- Rain Ponchos

Activities

Activity #1

Canoe paddling commands

1. Teacher orally introduces students to paddling commands in English and Lingit (using TPR) while demonstrating the correct action. Students join in as soon as possible.
2. Students take part in dry land practice following canoe paddling commands. In relay teams of 5, students listen to Lingit paddling commands as they paddle a canoe through a simulated (chalk or paper) river. Students who fail to follow the command correctly capsize (the teacher points to them) and they are required to go back to the start line and begin again.

Activity #2

Canoe field trip

1. As a culminating experience, students take a field trip with classmates, teachers and parents to a local lake or the ocean. Using traditional and contemporary canoes of varying structures and sizes, students paddle the canoe, following directions given in Lingit by Elders, knowledge bearer, teachers or parents.
2. Use appropriate Lingit vocabulary and language structures to direct students via paddling commands which the students follow throughout the field trip.



3. As students paddle the canoe try different ways of paddling,
 - a. Only paddling on one side causes a change of direction
 - b. Paddling backwards
 - c. Paddle forwards on one side, backwards on the other
 - d. Only one paddle
 - e. Paddle all randomly
 - f. Paddle together in rhythm
 - g. Paddle really fast
 - h. Paddle really slow
 - i. Paddle against wind/into wind
 - j. Paddle against current/into current
4. Teachers take pictures of students following commands correctly.

Activity #3

Log of Canoe Trip

When students return from the canoe trip, direct them to:

1. Label the pictures of themselves following the paddling commands (from Activity 2) with correct pre-written Lingít command labels,
2. Write a 3 – 5 paragraph journal entry telling about the canoe trip,
3. Draw pictures to accompany their journal entries.

Assessment

Collect student logs of the canoe trip and evaluate the writing using one or more traits of the analytical writing rubric. Determine their understanding of canoe commands and paddling techniques using their writing, illustrations and via individual questioning of students. In addition, assess student mastery of canoe commands in Lingít.

Resources

- Canoes, paddles, life jackets sufficient for all students
- Wall chart of canoe command phrases in Lingít
- Labels of canoe commands for students to adhere to own pictures
- Paddling song
- Word/ phrase cards for Lingít vocabulary/phrases
- Audio CD of Lingít words and phrases