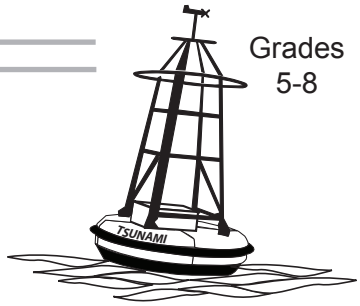
Traditional Knowledge of Tides

Grades 5-8



Overview:

Students gain cultural knowledge of tides and the shore environment in the form of language and through interaction with Elders. NOTE: This lesson should follow the lesson, "Tides vs. Tsunamis."

Targeted Alaska Grade Level Expectations:

Science

[5-8] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating.

[7] SB4.3 The student demonstrates an understanding of motions, forces, their characteristics, relationships, and effects by describing the characteristics of a wave (i.e., amplitude, wavelength, and frequency).

[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.

Targeted Alaska Grade Level Expectations:

[A5] Culturally knowledgeable students are well grounded in the cultural heritage and traditions of their community. Students who meet this cultural standard are able to reflect through their own actions the critical role that the local heritage language plays in fostering a sense of who they are and how they understand the world around them.

[D1] Culturally knowledgeable students are able to engage effectively in learning activities that are based on traditional ways of knowing and learning. Students who meet this cultural standard are able to acquire in-depth cultural knowledge through active participation and meaningful interaction with Elders.

[E2] Culturally knowledgeable students demonstrate an awareness and appreciation of the relationships and processes of interaction of all elements in the world around them. Students who meet this cultural standard are able to understand the ecology and geography of the bioregion they inhabit.

Objectives:

The student will:

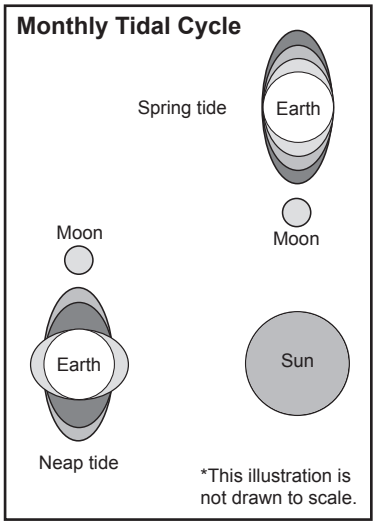
- say, write, and read the vocabulary in the Native language; and
- illustrate concepts related to the tide and shore environment.

Materials:

- Colored pencils and/or markers
- Large sheets of construction paper (two per student)
- Scissors
- Glue or tape
- Steffian, A. & Laktonen Counceller, A. (n.d.) *Alutiiq traditions: An introduction to the Native culture of the Kodiak archipelago*. Kodiak, Alaska: Alutiiq Museum and Archaeological Repository. (optional)

Science Basics:

As coastal people, the Alutiit and Unangas/n hold a close relationship with the land and sea. Familiarity with local tidal fluctuations is essential for knowing when to travel, where and when to gather foods, when the local conditions are out of the ordinary, and finally, potential hazards associated with tides. Visual and auditory signs of a tsunami are observable close to shore.



Tides are predictable. Their rhythmic occurrence is the result of the gravitational forces of the sun and moon. This force causes the oceans to bulge on opposite sides of Earth.

Spring tide: Occurs when the gravitational force of the sun and moon are in alignment, during new and full moons. This creates the largest range in tides.

Neap tide: Occurs when the gravitational force of the sun and moon are perpendicular. The tidal range is the weakest during this time.

Familiarity with the rhythmic nature of the tides can help distinguish when other forces are manipulating water levels and creating tsunamis. There are several observable signs that may precede a tsunami. Some signs may be observed visually, such as an earthquake, unusual bubbles in the water, or an unusually low, receding waterline. Sometimes the seafloor may be exposed for hundreds of feet, revealing seaweed, sunken ships, floundering sea life, and debris. Olga Bay Narrows and Akhiok resident Nick Alokli was in Old Harbor at the time of the 1964 earthquake and tsunami. He remarked, “Sitkalidak Strait dried up completely. We could see the rocks in the middle of the strait.” Other people in Old Harbor remember watching the water and noted strange tidal action. In the narrows between Sitkalidak Island and Kodiak Island, some men watched from a boat as the beach dried up behind them and then filled up again.

In Phuket, Thailand on December 26, 2004, a ten-year old girl named Tilly Smith was able to use knowledge of tsunamis to save the lives of her family members and other vacationers. Tilly reported in an interview with the media, “I was on the beach and the water started to go funny. There were bubbles and the tide went out all of a sudden. I recognized what was happening and had a feeling there was going to be a tsunami. I told mummy.” Tilly had just learned about earthquakes and tsunamis from her geography teacher at school in England before she went on vacation.

Some of the observable signs of an incoming tsunami may include sounds. Sucking, hissing, bubbling, and boiling may be heard as rocks, pebbles, and water are drawn out to sea. There may be an eerie silence along a coast that usually pounds with the sound of surf. Elena Suleimani, a Tsunami Modeler/Research Analyst at the University of Alaska Fairbanks Geophysical Institute, likens the sound to distant thunder at first, then a low-flying helicopter or a loud roar from the ocean. Interviewed after the 1964 earthquake and tsunami, Victor Zeeder of Kaguyak remembered, “I heard the water. Like the wind, you know. She was noisy.” Regarding Old Harbor, Alutiiq Elder Nick Alokli said, “We could just hear SSHHHH!!—Just so loud. It was just boiling, I think.” Other people of Old Harbor stated, “The men in the village heard clam shells rolling and ran for the hill.” Right before the final major wave hit Old Harbor, Larry Matfay and Mike T. “jumped off the boat, held each other by the hand, and ran up the beach. They ‘could feel it coming, the roar’” (Davis, 1971.)

The following vocabulary may be used when discussing the tide. The list is meant to be a starting point. It may be necessary to eliminate some words or add more related vocabulary depending on the needs of the learners. If necessary, make changes to the vocabulary to more accurately reflect the local language, and seek out Native language speakers to model pronunciation.

English	Sugt'stun	Western dialect of Unangam Tunuu	Eastern dialect of Unangam Tunuu
ocean	imaq	alaĝux̂	alaĝux̂
sun	macaq	aĝadax̂	aĝadax̂
moon	iraluq	tugidax̂	tugidax̂
beach	quta	agux̂ Lit. the part of the beach that is left dry at low tide, washed at high tide	tugumaĝix̂ Lit. long sandy beach
The tide is coming in.	Tung'irtuq.	Agux̂ chiĝdukux̂. Lit. The beach is covered up by the tide.	Agux̂ yakux̂. Lit. The beach is being flooded.
The tide is going out.	Kentuq.	Agux̂ aĝakux̂. Lit. The beach is showing up.	Agux̂ kitikux̂. Lit. The beach is draining.
Sources: Sugt'stun (Counceller, Leer & Alokli, 2006; Leer, 1978), Western dialect (Bergsland, 1994; Swetzof, 2008), Eastern dialect (Bergsland, 1994; Svarný Carlson, 1994)			

Activity Preparation:

1. Make arrangements for an Elder to come in to speak on tides. Explain you would like your students to hear how knowledge of local tide fluctuations is useful for knowing when to travel, where and when to gather foods, potential hazards associated with tides, and finally, knowing when the local conditions are out of the ordinary. If possible for the Elder and your class, plan the presentation at the beach where the Elder may point to relevant features directly. Plan for the Elder's comfort with snacks and drinks. Consider making a small gift of appreciation. With the Elder's permission, bring a digital camera to document information with photos.
2. Write the local Native language vocabulary on the board.
3. Create an example of a tab board using the directions from the STUDENT WORKSHEET.

Activity Procedure:

1. Review the differences between tsunamis and tidal waves.
2. Explain familiarity with local tidal fluctuations is useful for knowing when to travel, where and when to gather foods, potential hazards associated with tides, and finally, knowing when the local conditions are out of the ordinary. Share the information from Science Basics that describes observable signs of a tsunami.
3. Explain students will study vocabulary in the local Native language related to tides. Then, students will go to the beach to hear about local and traditional knowledge of tides.
4. Distribute STUDENT WORKSHEET: "Tidal Tab Board." Explain students will complete Part A only at this time. Allow time for students to practice the words.
5. Go to the beach for the presentation by the Elder. Encourage students to practice using the vocabulary.
6. Upon returning to the classroom, debrief by reviewing the information that was presented.
7. Distribute construction paper, scissors, and glue. Ask students to complete Part B of the worksheet. Present the teacher-made tab board as a model for students.

Extension Ideas:

- Look up or ask a Native speaker for other vocabulary related to the coastal environment and tides and include them in the tab board.
- Read the traditional story of the sun and moon called “Light – Tanqik: An Alutiiq Story,” ollected by F.A. Golder and reproduced in Steffian, A. & Laktonen Counceller, A. (n.d.) *Alutiiq traditions: An introduction to the Native culture of the Kodiak archipelago*. Kodiak, Alaska: Alutiiq Museum and Archaeological Repository. Use this story to address the Alaska Grade Level Expectation for science [5-6] SF1.1-SF3.1.

Answers:

Use the list in Science Basics to check for the correct word in each tab.

Lesson Information Sources:

Bergsland, K. (1994). *Aleut dictionary = Unangam tunudgusii: An unabridged lexicon of the Aleutian, Pribilof, and Cammander Islands Aleut language*. Fairbanks, Alaska: Alaska Native Language Center, University of Alaska Fairbanks.

Counceller, A. G. L., Leer, J., & Alokli, N. (2006). *Kodiak Alutiiq conversational phrasebook with audio CD*. Kodiak, Alaska: Alutiiq Museum & Archaeological Repository.

Davis, N. Y. (1971). *The effects of the 1964 Alaska earthquake, tsunami, and resettlement on two Koniag Eskimo villages.* Thesis (Ph. D.)--University of Washington, 1971.

Garza, D. A. (1999). *Tlingit moon & tide teaching resource: elementary level*. University of Alaska Sea Grant, SG-ED-33. Fairbanks, Alaska: University of Alaska Sea Grant.

Leer, J. (1978). *A conversational dictionary of Kodiak Alutiiq*. Fairbanks: Alaska Native Language Center, University of Alaska.

Steffian, A. & Counceller, A.L. (n.d.) *Alutiiq traditions: An introduction to the Native culture of the Kodiak archipelago*. Kodiak, Alaska: Alutiiq Museum and Archaeological Repository.

Švarný Carlson, B. (1994, May). Unangam words sweatshirt project. Retrieved June 24, 2008, from www.Alaskool.org Web site: http://www.alaskool.org/language/Aleut/Sea_Week.html

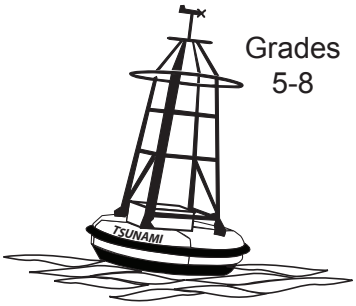
Swetzof, S. (2008, May 28) [personal communication].

Zike, D. (2001). *Dinah Zike’s big book of science: middle school & high school*. San Antonio, Tex: Dinah-Might Adventures.

Name:_____

Tidal Tab Board

Student Worksheet



Grades 5-8

As coastal people, the Alutiit and Unangas/n hold a close relationship with the land and sea. Knowledge of tides is important for knowing when to travel, where and when to gather foods, potential hazards associated with tides, and finally, knowing when the local conditions are out of the ordinary. Being familiar with the rhythm of the tides can help identify when another force is manipulating water levels and alert us of a tsunami.

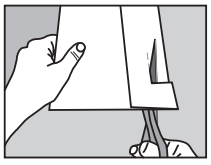
What are some words from the local language that could be used to talk about the tides and coastal environment?

Part A: Record the vocabulary in the box below, and listen carefully to the pronunciation of the words. Practice saying them. Think about how each word or phrase is connected to the coastal environment and tides.

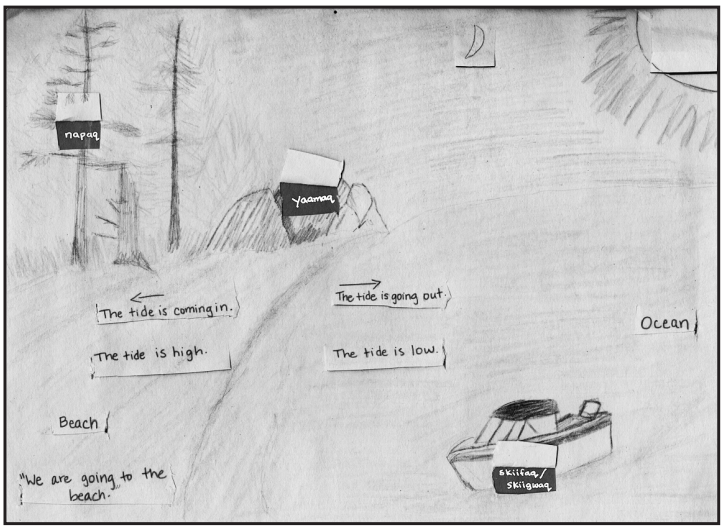
Part B: Creating a tab board is both informative and fun. To make one, follow the directions below.

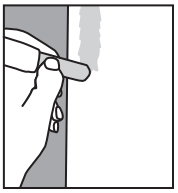
Procedure:

1. On one piece of construction paper, draw one large illustration or several small illustrations depicting vocabulary words and phrases. Add other vocabulary that relates to the coastal environment.
2. To cut the tabs, fold the paper in half horizontally over the area intended for the tab, then make an L-shaped cut (as shown at right).



3. Place this tabbed sheet of paper upside down, so that the illustration is facing the table. Apply glue or tape to areas where there are no tabs (as shown, bottom right).





4. Place another sheet of paper of the same size over the glue or tape.
5. Lift up each tab and print the correct Native language word that corresponds to the drawing on each tab.
6. Write your name on the tab board.
7. Use this tab board for quizzing yourself. Switch with classmates and quiz each other.