TRADITIONAL WEATHER FORECAST: SPEEDING CURRENTS GR: 9-12 (LESSON 3-4)

Elder Quotes:

I was a commercial fisherman for almost five years. My stepfather at the time had a big boat. I remember when I was maybe twelve we were going on a trip from Tatitlek to Cordova. They literally took off and said to me, "Take us to town." They wanted me to drive the boat. It was night. If I hadn't known the lay of the land, I would have never been able to do that. But at that young age I was able to go from Tatitlek to Cordova. I did everything by memory back then. I had to remember the sea at high tide and at low tide, and where to avoid the submerged trees or boulders. In certain places you'd see boats on their side because they forgot about the tide."

- *Steve Eleshansky, Chenega*[i]

Grade Level: 9-12

Overview:

Traditionally fishermen and hunters of the Chugach Region relied on their traditional ecological knowledge (TEK) of sea navigation. The careful observation of tide and river current behavior was used to predict the weather and ensure our ancestors safety. These observations can be even more precisely calculated and help train young eyes to recognize the speeding currents.

Standards:

AK Cultural:	*AK Content Science*:	*CRCC*:
A 3 Acquire and pass on the traditions of their community through oral and written history	**D 3** Develop an understanding of the cyclical changes controlled by energy from the sun and by Earths position and motion in our solar system	**Survival S 7** Students should be able to learn/observe the weather and tides

Lesson Goal: Students learn how to calculate the speed of the current and compare these mathematic calculations with visual clues.

Lesson Objectives: Students will:

- Learn to measure the speed of the river currents.
- Compare the current speeds at three different distances from the shoreline.
- Learn the related Sugt'stun and Eyak vocabulary.

Vocabulary Words: Sugt'stun Dialects

English:	Prince William Sound:	Lower Cook Inlet:	Eyak:
Big ground swells that are breaking on the beach across the bay		*Nmerneret*	
Low tide		*Ken'aq*	

High tide		*Tung'iq*	
Weather is calm		*Pinarlluku*	
Tide goes out		*Kenlluni*	
Tide comes in		*Tung'irluni*	

Materials/Resources Needed:

- Stopwatches (one per Recording Group)
- Two cones or markers
- Tape measure - at least 25'
- Clipboards, pens and paper

Website:

http://www.youtube.com/watch?v=Z0qGvC3vqaA Retrieved 8.21.2017. 3 minute BBC video on Inuit mussel harvest under sea ice at low tide

Teacher Preparation:

In this lesson activity, the students will learn how to measure the speed of the currents.
*Use math skills to compute the flow of tidal/river current or other moving objects.

- Converting units of measure: feet to miles; seconds to hours.
- Review Activity Plan to understand method used to measure current and able to explain the steps to students.
- Gather the materials needed.
- Practice Sugt'stun or Eyak vocabulary.
- Invite an Elder that has TEK expertise in predicting current speed and share information on how to gauge tidal or river current speed by observation.
- Before the Elder or Recognized Expert arrives, review with students, how to interact respectfully with the Elder during his or her visit.
- Determine an appropriate location to measure a river current or tidal speed, i.e., with at least a 60' straight run of moving water.
- Parent permission forms for field trip.

Opening:

Introduce and invite the Elder or Recognized Expert to describe when and where knowledge of a current's speed is important to him or her and how he or she classifies or estimates the speed of a current by observation only. Does he or she look to floating debris, water marks along the shore, or an awareness of the push or slowing of the boat's normal speed? Does the Elder have any memorable stories to share of what happened when someone failed to recognize or account for the speed of the tide when traveling by boat or collecting intertidal foods?

- *Optional*: Show the video of the undersea ice low tide mussel harvest. http://www.youtube.com/watch?v=Z0qGvC3vqaA

When a boat is broken down and drifting, the current's effects are of utmost importance. Understanding tidal or river current speed is vital to safe travel and hunting.

Share the following Elder quote:

> *I was a commercial fisherman for almost five years. My stepfather at the time had a big boat. I remember when I was maybe twelve we were going on a trip from Tatitlek to Cordova. They literally took off and said to me, "Take us to town." They wanted me to drive the boat. It was night. If I hadn't known the lay of the land, I would have never been able to do that. But at that young age I was able to go from Tatitlek to Cordova. I did everything by memory back then. I had to remember the sea at high tide and at low tide, and where to avoid the submerged trees or boulders. In certain places you'd see boats on their side because they forgot about the tide."*
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> - *Steve Eleshansky, Chenega*[ii]

<u>Activities</u>:

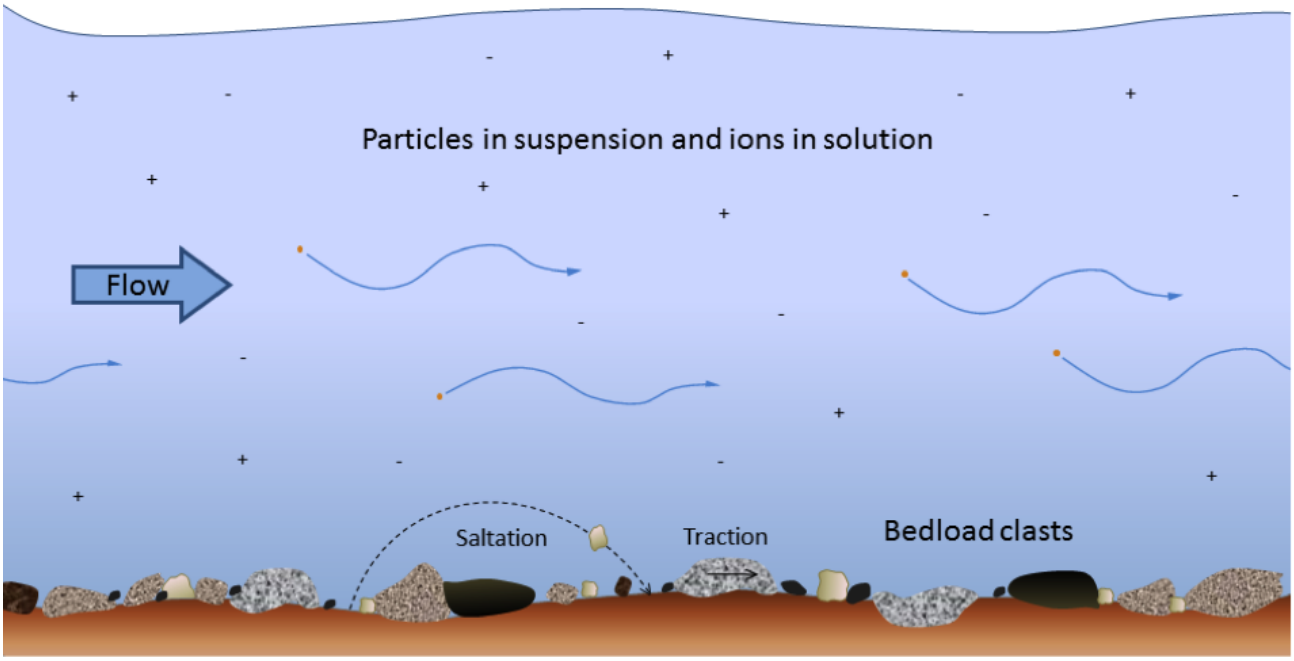
Class I:

1. Introduce the Elder or Recognized Expert.
2. Read out loud Steve Eleshansky's quote.
3. Discuss traditional ways the Elders were able to navigate our waterways.
4. Correlate the connection of knowing tides, wind and currents for safe water travels.
5. Explain how to measure currents and the method that will be used to measure during the field trip.
6. Have the students practice calculations and understand fully the experiment.
7. Hand out the permission forms for designated field trip.

Class II:

1. Collect the permission slips.
2. Go to chosen location with cones and measuring tapes.
3. Using the tape measure place two cones 53' apart alongside the moving water on top of the river bank or ocean shore.
4. Explain why we would put the cones 53' apart.
    a. It is because 53' is very close to 1/100 of a mile (5,280'/100).
    b. Dividing 36 by the number of seconds the stick travels downstream and the result is the current's speed in miles per hour.
5. Gather sticks to throw into the current and place at the upstream cone.
6. Divide students into small groups (***Upstream Thrower, Downstream Timer, and Recorder***) and distribute clipboards, papers, and pens to the designated Recorder and a stopwatch to each Timer. Students will record at least three trials (nearshore, middle distance, mid-stream) of the stick's travel time.
7. When the ***Downstream Timer*** gives the go ahead, the ***Upstream Thrower*** students throw a stick into the water in line with the upstream cone. The ***Downstream Timer*** will record the amount of time it takes the stick to get even with the downstream cone and announce the time to the ***Recorder***.
8. Once the trials are complete return to the class room for groups to share their times for the three trials. Have students calculate the average speed of each trial.

9. Is this river or creek current affected by tidal action? Discuss how this technique might be adapted to calculate the speed of a tidal current. Does this exercise help develop a sense of what water current speed looks like?
10. *Optional*: Measure the speed of drifting ice in the fall or spring.



Assessment:

- Students correctly calculated the speed of a river current at three different distances from the river bank.
- Students evaluated and explained the potential of the speed calculation method for measuring tidal currents.
- Students correctly pronounced the Sugt'stun and Eyak vocabulary words.

[i] Quoted in Smelcer, J. E., & Young, M. A. (2007). *We are the land, we are the sea: stories of subsistence from the people of Chenega*. Anchorage, AK: Chenega Heritage, Inc. pp.21-21

[ii] Quoted in Smelcer, J. E., & Young, M. A. (2007). *We are the land, we are the sea: stories of subsistence from the people of Chenega*. Anchorage, AK: Chenega Heritage, Inc. pp.21-21