
Investigating Tlingit Ecological Knowledge

A Science and Literacy Unit for High School

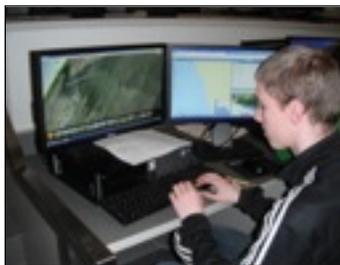


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A Science and Literacy Unit for High School

Unit Overview

Over the course of this ecological literacy unit, students will practice reading, writing, listening, and oral language strategies while developing understanding for Tlingit oral narratives and technological tools and systems. This multi-week, seven-lesson unit focuses on an interdisciplinary study of the oral narrative “*Basket Bay History*” to establish equity in science, math, and literacy. Students will be challenged by the combination of Tlingit and Western science as they engage in projects focused on field investigations of Southeast Alaska’s natural history and local ecosystems, Tlingit migration in relation to glaciation, and exploring today’s technology to bring clarity to the question that unites us all, *why do we live here?*



Why Use Oral Narratives?

Tlingit oral narratives contain many layers which enrich our knowledge and imagination. On one level, these stories are great entertainment. Some Tlingit narratives explain how aspects of our world came to be. Other oral narratives relate epic adventures of specific clan ancestors. Stories involving Raven often include humorous exploits which may lead us to reflect upon respectful treatment of others. However, oral narratives were not told solely for entertainment.

In the past, oral narratives were used to convey many forms of knowledge. They taught about place names, property, geography, and science. From these stories, younger generations would learn about food preparation, the ebb and flow of the tides, and behavioral patterns of hunted mammals. Many of these stories assisted in the teaching of life skills such as navigation and obtaining food from the land. In addition, oral narratives were used to convey traditional values and social responsibility: They explore human nature and may involve concepts of identity, alienation and isolation, coming of age, loyalty, pride, loss, and other conflicts humans experience throughout life. These stories are spiritual, intellectual gifts which have been passed down from esteemed ancestors. Like all good literature, Tlingit oral narratives can be used to enhance content learning in the classroom. These stories can be used as a springboard to teach history, geography, science, mathematics, Tlingit heritage language, reading, writing, and more.

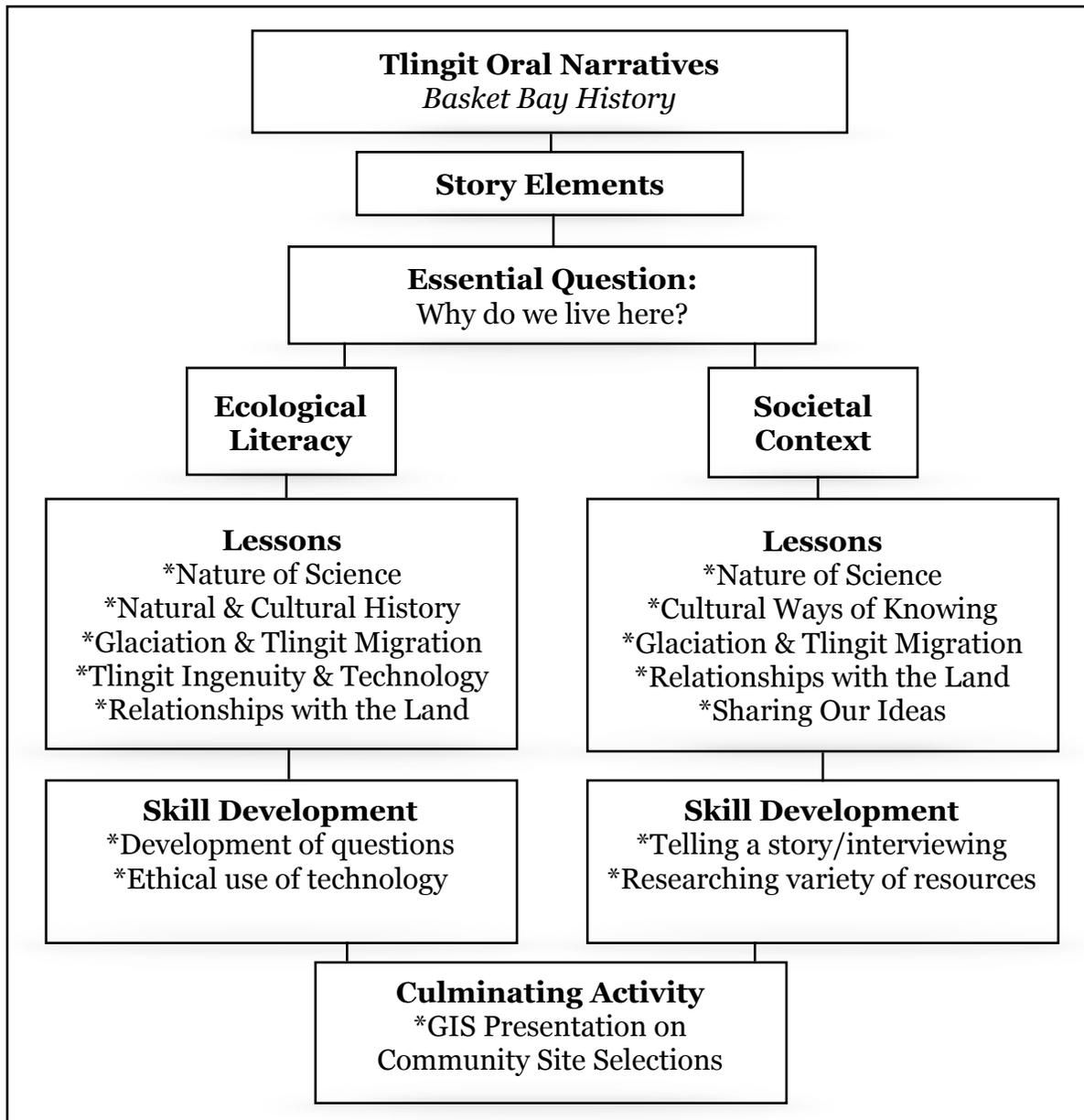
Note: *Tlingit oral narratives are the property of specific clans. For many stories, permission is needed before they are used in the classroom. The *Basket Bay History* story this unit refers to is from the *Haa Shuka, Our Ancestors* compiled by Nora Marks Dauenhauer and Richard Dauenhauer as told by Robert Zuboff.*

Tlingit Story Elements

This unit will focus on two Tlingit story elements: *ecological literacy* and *societal context*. Students will build background knowledge as they meet and listen to elders and community members, read informational and narrative text, engage in local harvest, practice traditional processing and preservation techniques, conduct scientific experiments, and prepare a GIS (Geographical Information Systems) presentation as the culminating activity to address the essential question:

- Why do we live here?

The following chart illustrates how lessons were derived from the Tlingit oral narratives.



Embedded Literacy Strategies

The lessons in this unit utilize specific literacy strategies to scaffold student learning. Guided reading strategies ensure comprehension of informative and narrative text. Guided writing strategies allow students to communicate what they learned and to engage in the writing process effectively. The following chart defines the strategies which are incorporated into this unit.

Reading Strategies	Writing Strategies
<p>Guided Reading: Teacher models specific strategies to guide students through challenging text.</p> <p>Predicting: Students make guesses about the text by using text features; title, pictures, and/or thinking ahead about events which could occur, based on evidence in the text.</p> <p>Marking the text: Students select text by highlighting or underlining specific components such as the main idea.</p> <p>Summarizing/Paraphrasing: Students restate in own words the essential information or main idea of a text.</p> <p>Story Maps: Students use a clearly defined graphic organizer to identify story elements.</p> <p>Word Maps: Students use a clearly defined graphic organizer to identify and reinforce word meanings.</p>	<p>Guided Writing: Teacher models the writing students are expected to do by guiding them through the writing process before students are expected to perform the same process.</p> <p>Brainstorming: Students list multiple ideas in a short amount of time without excluding any ideas.</p> <p>Drafting: Students incorporate brainstorming ideas into a written format or story.</p> <p>Marking the Draft: Students highlight or underline or code areas for revision.</p> <p>Generating Questions: Students clarify and develop ideas by asking questions of the draft. This may be a part of self-editing or peer editing.</p> <p>Adding Details: Students enhance text by adding additional words, phrases, sentences, or ideas.</p> <p>Self-Editing/Peer Editing: Students work alone or with a partner to examine and identify areas that might need correction for grammar, punctuation, and spelling.</p>
Speaking Strategies	Math Strategies
<p>Oral Reading: Students read aloud one’s own text or the texts of others to share work, build fluency and increase confidence in presenting to a group.</p> <p>Rehearsal: Students engage in multiple practices of a piece of text prior to performance to refine use of story telling techniques.</p>	<p>Think-Pair-Share: Students work individually to analyze the problem and partner up to share reflections.</p> <p>Graphic Representation: Students interpret mathematical concepts to create visual organization of data.</p> <p>Group Presentation: Students work together to share graphic representations, analysis, and conclusions.</p>

Standards Addressed in this Unit

Themes (parallels AP Environmental Science Content as found at <http://apcentral.collegeboard.com/apc/public/repository/ap-environmental-science-course-description.pdf> and Juneau School Districts science content standards)

Science

1. Science as Inquiry and Process

- Science is a method of learning and constantly changes the way we understand the world
- SA1.1 Students ask questions, predict, observe, describe, measure, classify, make generalizations, analyze data, develop models, infer, and communicate
- SA1.2 Students recognize and analyze multiple explanations and models, use information to revise student's own explanation or model if necessary
- SA2.1 Evaluate credibility of cited sources when conducting the student's own scientific investigation
- SA3.1 Conducts research and communicates results to solve a problem

2. Energy conversions underlie all ecological processes

- Energy cannot be created; it must come from somewhere
- SC3.1 Relate carbon cycle to global climate change

c. The Earth itself is one interconnected system

- Biogeochemical and natural systems vary in ability to recover from disturbances
- SC3.2 Analyze potential impacts of changes

d. Humans alter natural systems

- Technology and population growth have enabled humans to increase both the rate and scale of their impact on the environment
- SD3.1 Describe causes, effects, preventions, and mitigations of human impact

e. Environmental problems have a cultural and social context

- Understanding the role of cultural, social, and economic factors is vital for solutions
- SE1.1 Research how social, economic, and political forces strongly influence which technology will be developed

f. Human survival depends on developing practices that will achieve sustainable systems

- A suitable combination of conservation and development is required
- SF1.1-SF3.1 Investigate the influences of societal and or cultural beliefs on science

Language Arts

a. The student restates/summarizes and connects information.

R4.2 Summarize information or ideas from a text and make connections between summarized information or sets of ideas and related topics or information

b. Student analyzes content of text to differentiate fact and opinion

R2.9 a. Differentiate between fact and opinion. b. Express opinions about text with support

c. Student connects and evaluates cultural influences/events.

R3.10 Compare and contrast how texts reflect historical and cultural influences.

R4.9 Analyze the effects of cultural and historical influences on texts.

Cultural Standards

A.2 Students will recount their own genealogy and family history

B.4 Identify appropriate forms of technology and their use for improving community

D.3 Interact with Elders in a loving and respectful way that demonstrates and appreciation of their role as culture-bearers and educators in the community

E.2 Understand the ecology and geography of the bioregion they inhabit

Curriculum Review

The unit, in its entirety, can take up to six weeks or through an entire semester. Individual lessons or a combination of lessons from this unit can be used to address ecological literacy and the development of scientific reasoning skills. The curriculum derived from the course, Investigating Traditional Ecological Knowledge, which was initially piloted in Spring of 2013 in the Juneau School District (JSD). The class was sponsored by Goldbelt Heritage Foundation (GHF) and the University of Alaska Southeast (UAS) School of Education. Henry Hopkins, Juneau High School's biology teacher was the district teacher-of-record and Frank Coenraad of UAS was the university teacher-of-record. The class was part of the Department of Education's Demonstration Grant for Indian Children. Thirteen students from all three JSD high schools completed the class for 1/2 elective credit and 3 university credits. The class was made possible with great contributions of time, knowledge, and kindness from Tlingit elders and knowledge bearers, UAS professors, JSD teachers and staff, and United States Forest Service scientists.

Assessments

Throughout this unit students are assessed on the standards and how well they respond to the essential questions. The standards are the objectives for each lesson. This unit includes both formative and summative assessments:

- Pre-assessment and post assessment tests
- Paraphrasing to demonstrate comprehension
- Journal writing prompts
- Final presentation scoring guide/rubric

Elders & Cultural Specialists in the Classroom

Students benefit from listening to elders and cultural specialists. An elder or cultural specialist should be invited to tell the story of *Basket Bay History* in their own words as an introduction to the unit. If the elder/culture bearer is a heritage language speaker, they might also teach heritage vocabulary and phrases related to ecology and harvest.

Supplemental Materials & Suggested Texts

This unit consists of project rubrics, concept maps, student worksheets, PowerPoints, and articles. In addition, there are four narrated slideshows that accompany and enhance specified lessons provided by Goldbelt Heritage Foundation on the USB drive associated with this unit. These slideshows were created by Richard Carstensen, lead expert of Natural History for Discovery Southeast. Each slideshow is approximately twenty minutes long and provide incredible detail and insight on community siting factors and the dynamic landscape of Southeast Alaska.

- Haa Shuká, Our Ancestors: Tlingit Oral Narratives. Nora Marks Dauenhauer and Richard Dauenhauer. 1987. Volume 1.
- Haa Atxaayí Haa Kusteeyíx Sitee, Our Food is Our Tlingit Way of Life. Excerpts from Oral Interviews. Richard G. Newton and Madonna L. Moss. USDA 3rd Edition.
- Haa Léelk'w Hás Aaní Saax'ú: Our Grandparents' Names on the Land. Edited by Thomas F. Thornton. 2012.
- SpringBoard Mathematics with Meaning: Middle School 3. Collegeboard 2010

<p style="text-align: center;">Final Project Rubric: <i>Community Site Selection & Presentation</i></p>	<p>Name:</p> <p>Group Members:</p>	
<p>Grading Criterion (3 points/each)</p>	<p>No</p>	<p>Yes</p>
<p>Preparation: Student utilized the siting factor guidelines and project rubric to organize & plan their work.</p>		
<p>Focus on Task: Used time well, focused on the project, worked well with others.</p>		
<p>Essential Question: Created an original, interesting way to address the essential question in their presentation.</p>		
<p>Identity: Individuals introduce themselves by presenting their lineage (either through a Tlingit or English introduction), acknowledge Tlingit aani and the land they stand, and their migration history to this place to the best of their understanding.</p>		
<p>Audience Awareness: Design, vocabulary, audio, and graphics fit target audience</p>		
<p>Voice Consistency: Voice quality is clear and audible throughout the presentation</p>		
<p>Voice Pacing: The pace fits the information presented and draws the audience into the story.</p>		
<p>Narration: Each member narrates a section within the presentation. Tlingit and English names of sites are given.</p>		
<p>Imagery: Each individual selects at least three images of their site selection.</p> <ul style="list-style-type: none"> • Map highlighting the location of both the winter and seasonal sites • Satellite image of the specific coastline • ShoreZone images of their specific site locations. 		
<p>Detail: Presentation has exactly the right amount of detail-not too short or too long.</p>		
<p>Highlights: Each community site will have a strong feature to highlight (gardens, canoe beach, summer food preparation site, fresh water, etc). Groups will need to identify the component to highlight and incorporate additional information learned throughout the unit.</p>		
<p>Purpose: Establishes purpose early and maintains that focus throughout.</p>		
<p>Duration: Group presentation is between 3 to 5 minutes in length.</p>		
<p>Requirements: Product includes all required elements.</p>		
<p>Total Points (42 points available):</p>		

Overview of Lessons	Literacy Strategies	Academic Vocabulary	Assessments
<p>Lesson 1: Nature of Science <i>Science is a Process</i> Students explore the convergence of western and traditional science through guided reading, discussion, and reflection writing.</p> <ul style="list-style-type: none"> • Student Page: “Ways of Knowing” article • Student Page: “Western science & traditional knowledge” article 	<ul style="list-style-type: none"> • Guided writing • Quick-write • Think-Pair-Share • Mark the text • Paraphrasing 	<ul style="list-style-type: none"> • traditional ecological knowledge • western science • empiricism 	<ul style="list-style-type: none"> • Journal Prompt • Peer Reflections
<p>Lesson 2: Cultural Ways of Knowing <i>Science is a Process</i> Students practice problem-solving strategies as they create graphic representations of abstract concepts regarding the future of science.</p> <ul style="list-style-type: none"> • Student Page: What is an oral narrative? • Student Page: Venn diagram template 	<ul style="list-style-type: none"> • Graphic representation • Generating questions • Annotations • Quick-write • Paraphrasing 	<ul style="list-style-type: none"> • oral narrative • cultural context 	<ul style="list-style-type: none"> • Article summaries & annotations (peer review) • Diagram
<p>Lesson 3: Natural & Cultural History <i>Energy conversions underlie all ecological processes</i> Students are introduced to the unit’s culminating activity expectations to use the problem-solving strategy of working backwards to find the answer.</p> <ul style="list-style-type: none"> • Student Page: Learner’s journey concept map • Student Page: Final project scoring guide • Student Page: Aak’w Kwaan/Taak’u Kwaan Map • Student Page: Siting factors diagram • Student Page: <i>Basket Bay History</i> story • Student Page: <i>Basket Bay</i> Responses 	<ul style="list-style-type: none"> • Note-taking • Generating questions • Discussion group • Debriefing • Work backward • Oral Reading • Rereading 	<ul style="list-style-type: none"> • abiotic • biotic • ecosystem dynamics • archipelago 	<ul style="list-style-type: none"> • Quick-write • Siting factor group work • Abiotic and Biotic Factor responses
<p>Lesson 4: Glaciation & Tlingit Migration <i>The Earth is one interconnected system</i> Students explore the power of glaciers and the energy transfer of the surrounding ecosystems. Direct connections are made between local glacier activity and Tlingit migration.</p> <ul style="list-style-type: none"> • Student Page: SE Alaska Map • Student Page: Siting Factor Outline • Student Page: Oral Tradition Journal Excerpts • Student Page: Migration History Worksheets 	<ul style="list-style-type: none"> • Quick-write • Think-Pair-Share • Mark the Text • Oral Reading • Note-taking • Paraphrasing 	<ul style="list-style-type: none"> • Little Ice Age • Isostatic rebound • Carbon cycle • Calving rates • Basal slip & surge • Terminus 	<ul style="list-style-type: none"> • Basket Bay responses • Short-term lineage project
<p>Lesson 5: Tlingit Ingenuity & Technology <i>Environmental problems have cultural & social context</i></p> <ul style="list-style-type: none"> • Student Page: Free Response Assessment • Student Page: Excerpts from “Tleikwaani, the “berried” landscape” • Tlingit Ingenuity PowerPoint 	<ul style="list-style-type: none"> • Quick-write • Mark the Text • Oral Reading • Note-taking 	<ul style="list-style-type: none"> • displacement • fermentation • pH • anaerobic respiration 	<ul style="list-style-type: none"> • Free Response • Article summary
<p>Lesson 6: Relationships with the Land <i>Human survival depends on sustainable practices</i></p> <ul style="list-style-type: none"> • Student Page: Student site selection (3 exported images) 	<ul style="list-style-type: none"> • Think-Pair-Share • Note-taking • Work 	<ul style="list-style-type: none"> • geographical information systems (GIS) layers 	<ul style="list-style-type: none"> • Final project preparation
<p>Lesson 7: Sharing Our Ideas <i>Science is a Process</i></p> <ul style="list-style-type: none"> • Student Page: Final presentation slideshow 	<ul style="list-style-type: none"> • Graphic representation • Paraphrasing 	<ul style="list-style-type: none"> • respect 	<ul style="list-style-type: none"> • Final project slideshow

Lesson 1

Nature of Science

Purpose

To introduce students to primary resource analysis and interpretation regarding the nature of science; to develop the skill of gathering information from multiple resources; to assess and build background knowledge of traditional ecological knowledge; to increase listening, reading, and writing fluency.

Essential Questions

- What is the nature of science?

Duration

75 minutes (1-2 sessions)

Lesson Objectives: Connecting to the Standards

SA2.1 Evaluate credibility of cited sources when conducting the student's own scientific investigation
SA3.1 Conducts research and communicates results to solve a problem
SF1.1-SF3.1 Investigate the influences of societal and or cultural beliefs on science
R3.10 Compare and contrast how texts reflect historical and cultural influences.
R4.2 Summarize information or ideas from a text and make connections between summarized information or sets of ideas and related topics or information

Academic Vocabulary

- Traditional ecological knowledge
- Western science
- Methodologies
- Empiricism

Materials

- Student composition notebooks
- “Ways of knowing” article: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1479546/>
- “Western Science and traditional knowledge” article

Suggested Guests

- Elder to introduce Tlingit science (David Katzeek, Paul Marks-Goldbelt Heritage Foundation)
- Paul Berg (Juneau School District) to speak to high and low context cultural differences

Literacy Strategies

- Guided writing
- Quick-write
- Think-Pair-Share
- Marking the text
- Adding details
- Annotations
- Paraphrasing

Assessments

- Pre-assessment journal response: *Essential Question*
- Check for student understanding: *Think-Pair-Share; Class list of science methodology factors*

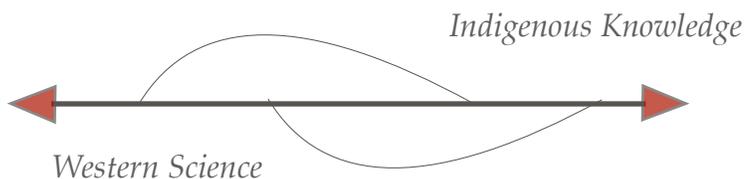
Procedure

Step 1) Introducing Content: 15 minutes

- Welcome students to a class that will challenge the way they approach science and the way they interpret the world around them. Students can expect to utilize familiar concepts such as the scientific method, but will also learn from Tlingit pedagogy in the search to find previously undiscovered commonalities and differences in the two methodologies.
- Draw a timeline on the board (this timeline was originally presented to Paul Berg of Goldbelt Heritage Foundation by a Oglala-Sioux Elder in South Dakota):



- The timeline represents time immemorial to the left (all that humans remember in our history) and the future. The curve represents knowledge held by many cultures worldwide about how the world works. It extends far into the past and includes the future.



- The second arc underneath the timeline represents what collectively is called western science, what students are familiar from learning in school. It is not as ancient as indigenous knowledge, but with tools and technology, western science is able to examine microcosms and extend theories into the future.



- Finally, the green shaded in area is what the class will be focusing on. This knowledge is held by indigenous cultures worldwide and is called Traditional Ecological Knowledge. It is a wealth of knowledge and explanations of other macro- and micro-dimensions western science has yet to consider.

Step 2) Assessing Background Knowledge: 30 minutes

Explain:

- In order to move forward together, there needs to be a common definition of science. Hand out student binders and answer essential questions in composition notebook as a pre-assessment and present the essential questions of the lesson:
Question 1) *What is the nature of science?*
- Teacher can use guided writing strategy to model their journal response to the question. Responses should take in consideration factors such as:
 - ❖ how do researchers conduct science, what are they looking for, how do scientists communicate their findings, and the role of ethics, culture, tools and technology (*answers will be shared during a think-pair-share session*).

Assess:

- Pair the students and have them read their answers for just Question 1.
 - Student pairs should compare and contrast their answers to create a list of unifying factors both of their reflections share
 - Student pairs should take the overlapping factors and create a working definition of science (2-3 sentences)
- Create a class list of student-driven scientific factors on the board for students to take down as notes
- Have each pair read aloud their definition of science to the class

Step 3) Building Background Knowledge: 30 minutes

- Discuss the similarities and differences in their individual responses. Read aloud (or hand out quote to staple into science notebook) the definition of science as given by the Dalai Lama of Tibet when asked to compare contemplative and scientific explanations of the world:
“For me, science is first and foremost an empirical discipline that provides humanity with a powerful access to understanding the nature of the physical and living world. It is essentially a mode of inquiry that gives us fantastically detailed knowledge of the empirical world and the underlying laws of nature, which we infer from the empirical data. Science processes by means of a very specific method that involves measurement, quantification, and intersubjective verification through repeatable experiments. This, at least, is the nature of the scientific method as it exists within the current paradigm.”
- Add any factors to the class list such as measurement, quantification, and verification through repeatable experiments if they are missing and check for student understanding
- Finish presenting the Dalai Lama’s definition:

“Within this model, many aspects of human existence, including values, creativity, and spirituality, as well as deeper metaphysical questions, lie outside the scope of scientific inquiry.”

- Reemphasize the intention of the class is to find the overlap between western and traditional science methodology, the overlap will naturally be found in the humanizing elements of how and why science is conducted.
- Pass out the “Ways of Knowing” article and allow time for students to read in class. Encourage marking the text.
 - ❖ **Marking the text:** If your students are unfamiliar with this strategy, demonstrate how to mark the text for main ideas using the first few sentences. Underline or circle key words or phrases which help to answer the question: What is an oral narrative? Have students use the strategy for the remaining paragraphs for homework.
- Add additional factors to the what is science class list that may have been generated from the article and have students save article in notebook for the next class.

Homework: *Reading for Information & Summarizing*

- **Homework:** Pass out “Western Science and Traditional Knowledge”
- Students will read to answer the question: What is the nature of science?
- **Marking the text:** If your students are unfamiliar with this strategy, demonstrate how to mark the text for main ideas using the first few sentences. Underline or circle key words or phrases which help to answer the question: What is the nature of science? Have students use the strategy for the remaining paragraphs for homework.
- **Make annotations:** Students should write down thoughts or questions in the margins as they read.
- **Reread:** Students should be encouraged to reread the text to check for details they may have missed the first time.
- **Paraphrase:** Students will need to paraphrase their new understanding of *what is the nature science* in their journals for homework (1-2 paragraph response).

Lesson 2

The Ways We Learn

Purpose

To introduce students to Tlingit oral narratives and cultural ways of knowing; to create graphic representations of abstract concepts; to build primary resource analysis and interpretation skills; to identify individual learning styles; to develop the skill of gathering information from multiple resources; to assess and build background knowledge of Tlingit and western science; to increase listening, reading, and writing fluency.

Essential Questions

- What are the different ways we learn?

Duration

75 minutes (2-3 sessions)

Lesson Objectives: Connecting to the Standards

SA1.2 Students recognize and analyze multiple explanations and models, use information to revise student's own explanation or model if necessary
SA3.1 Conducts research and communicates results to solve a problem
SF1.1-SF3.1 Investigate the influences of societal and or cultural beliefs on science
R4.2 Summarize information or ideas from a text and make connections between summarized information or sets of ideas and related topics or information
R2.9 a. Differentiate between fact and opinion. b. Express opinions about text with support
D.3 Interact with Elders in a loving and respectful way that demonstrates and appreciation of their role as culture-bearers and educators in the community
E.2 Understand the ecology and geography of the bioregion they inhabit

Academic Vocabulary

- oral narrative
- cultural context

Materials

- Student composition notebooks
- Blank Venn Diagram template
- "What is an oral narrative" worksheet
- Brain dominance assessment package

Suggested Guests

- Elder to introduce Tlingit oral narrative (contact Goldbelt Heritage Foundation)

- Paul Berg (Juneau School District) to speak to high and low context cultural differences and the role of culture in science today

Literacy Strategies

- Graphic representation
- Generating questions
- Marking the Text
- Quick-write
- Rereading
- Annotations
- Paraphrasing

Assessments & Student Pages

- Pre-assessment: Peer review and share out of article summaries (homework from lesson #1)
- Assessment: *Creating a venn diagram (Western science and Tlingit science)*
- Assessment: *What is an oral narrative?*

Procedure

Step 1) Introducing Content: 30 minutes

- Begin with summarizing the article students read for homework, “Western science and traditional knowledge.”
- Model peer review and discuss how self and peer revision will be a regular part of the class. When reading, reviewing, and editing each other’s work, suggestions and reflections should be given in a respectful manner.
- Students should exchange their article summaries for peer revision and group discussion about the new topic of western science and traditional knowledge

Step 2) Assessing Background Knowledge: 20 minutes

Explain:

- As the author of “Western science and traditional knowledge,” Fulvio Mazzocchi stated:
“despite their variations, different forms of knowledge can learn from each other...the British anthropologist Gregory Bateson has compared knowledge about the material world to a map and the terrain it describes: the map itself is not the terrain, but only one representation of it (Bateson, 1979). Just as different maps can give accounts of the same territory, so too can different forms of knowledge about the material world. Its actual representation ultimately depends on the observer’s view.”
- With great societal change and challenges, tremendous solutions wait on the horizon. Scientific reductionism has explained in great detail many components of the natural world. Western science, however, becomes a cultural myth when stated as the only way to approach truth. Traditional scientific approaches of controlled, repeatable experiments cannot be applied to phenomena that fall outside of specific conditions.
“...Hence, the integration of methods and results from different approaches

and levels of analysis can become essential. These considerations seem to be particularly relevant for studying biological, ecological and social phenomena that include different levels of complexity. As already mentioned, the Western tradition of thinking is developing a different approach to gaining knowledge from complex systems, but it would be equally useful to learn how traditional approaches explain such complexity. Not only are they more holistic, but also they seem to be better suited to coping with the uncertainty and unpredictability that are viewed as intrinsic characteristics of natural systems. Western science and traditional knowledge constitute different paths to knowledge, but they are rooted in the same reality. We can only gain from paying attention to our cultural history and richness.”

Assess:

- Using their resources (notes, summaries, and the two annotated articles from lesson #1 “Ways of knowing” and “Western science and traditional knowledge”) students should work individually to create a graphic representation of their understanding of the similarities, differences, and commonalities of western and Tlingit science methodologies in a Venn Diagram (*to be collected for a grade*). *Venn diagram worksheet included at the end of the lesson plan.

Step 3) Building Background Knowledge: 25 minutes

Cultural Ways of Knowing:

- Cultural ways of knowing have been categorized into high and low context cultures. There is no good or bad within these schemas, it just refers to how people in varying societies learn and conduct their daily lives.
 - ❖ Low context refers to cultures that depend heavily on directional language for communication, understanding, and reference. Families tend to be nuclear and societal systems are divided and reduced for simplification. Examples of low context culture are many Western societies and institutions. American education system is extremely low context as demonstrated by 70% of the school day being devoted to instructions “take out your book, turn the page, change classes, etc...”
 - ❖ High context cultures consist of many Indigenous cultures. Words are more of a releaser between community members, with many things being communicated through body language and context. It is not unusual for individuals to be multi-talented in dancing, singing, musical instruments, acting, producing art work and crafts. Families are community-oriented and there are usually multi-generations living in one household. French society is another example of high context culture.
- Oftentimes, placing high context individuals in low context settings does not work well. Americans can go both ways. Low context within our institutions and dominant language, but high context on special days like graduation and weddings.
- Explain that just as there are cultural ways of knowing, individual ways of knowing also differ greatly across humanity. Pass out “Brain dominance assessment” for students to fill out for homework. Explain that they are to answer the questions based on their true tendencies and to not overthink each question to vary the answers.
- Due to a great difference in ways of knowing, there are a variety of ways of sharing knowledge. Within today’s Western paradigm, science theories and facts are only

accepted out of peer-reviewed scientific journals where multiple experts have checked experiments and conclusions. In Tlingit culture, information is shared through oral narratives and At.oow', sacred belongings of families and clans. Just as the Smithsonian Institute contains libraries of knowledge, elders hold ancient knowledge that was tested as true through the act of living in Alaska's dynamic landscapes. The oral narratives, Chilkat and button blankets, hats, armor, wooden sculptures, and other At.oow' act as the peer-reviewed journals that communicate and verify certain theories, facts, and conclusions about natural systems.

Tlingit Oral Narratives in this Unit:

- Introduce Tlingit oral narratives by creating a discussion around what students think an oral narrative might be.
- Explain that oral narratives have different purposes and pass out the “what is an oral narrative?” worksheet. Students should read through the description remembering to mark the text, annotate, and paraphrasing their understanding of the significance of oral narratives. As a class, two Tlingit oral narratives will accompany science lessons to better understand the ecology and natural history of Alaska to help answer the unit's essential question, “why do we live here?”
 - ❖ If possible, have a Tlingit knowledge bearer such as David Katzeek, Paul Marks, or Fred White visit the class to lead the discussion of what is an oral narrative and if they feel up to it, to share one with the class. Depending on clan rights and who is able to present to the class, it would be ideal to have either the *Basket Bay History* be told, but students will benefit from any oral narrative shared with them.
- Deeper exploration of the oral narrative and interactions with Tlingit elders and knowledge bearers will be presented throughout the unit. One type of oral narrative will accompany this unit, it is a historical records not a fictional story. The oral narrative speaks of migration through Southeast Alaska and the hero's journey that historical Tlingits embarked on. Every student is also on a learner's journey.

Homework: Reading for Information & Graphic Representations

- *Homework:* Students to complete “Brain dominance assessment” packet to identify individual learning styles and strengths.
- **Paraphrase:** Students should summarize their learning preferences and how they believe this influences them throughout the school day and learning outside of school as well. *Are there certain hobbies or interests they prefer because of their learning styles, do certain teachers use strategies that help them learn, do they recognize when information is presented to them in a challenging way?*

Lesson 3

Alaska's Natural History

Purpose

To introduce students to unit and final presentation; to distinguish the abiotic and biotic factors that support life in Southeast Alaska; to introduce Aak'w Kwaan and Taak'u Kwaan ancestral lands; to build primary resource analysis and interpretation skills; to develop the skill of gathering information from multiple resources; to assess and build background knowledge of Tlingit and western science; to increase listening, reading, and writing fluency.

Essential Questions

- What are the ecological conditions that support human life?

Duration

150 minutes (2 75-minute sessions)

Lesson Objectives: Connecting to the Standards

SA1.1 Students ask questions, predict, observe, describe, measure, classify, make generalizations, analyze data, develop models, infer, and communicate
SF1.1-SF3.1 Investigate the influences of societal and or cultural beliefs on science
R4.2 Summarize information or ideas from a text and make connections between summarized information or sets of ideas and related topics or information
R2.9 a. Differentiate between fact and opinion. b. Express opinions about text with support
E.2 Understand the ecology and geography of the bioregion they inhabit

Academic Vocabulary

- abiotic
- biotic
- ecosystem dynamics
- archipelago

Materials

- Student composition notebooks
- Learner's Journey Concept Map
- Final Project Student Rubric
- Aak'w Kwaan and Taak'u Kwaan map
- Siting factor diagram
- Copies of *Basket Bay History*
- *Basket Bay History* worksheet (homework)

Suggested Guests

- Richard Carstensen of Discovery Southeast; Lead Scientist of Natural History
- David Katzeek of GHF; Knowledge Bearer of Tlingit Community Sites

Literacy Strategies

- Note-taking
- Generating questions
- Debriefing
- Quick-write
- Work backward
- Paraphrasing

Assessments

- Pre-assessment: *What you think you need to know (journal prompt)*
- Assessment: *Siting factor sheet (student page)*

Lesson Extension (Field Study Experience)

- Create a cultural-heritage ecological survey for students to search for biotic factors around the school or in a field trip to the coastline. For plants and animals found, have students research the significance to Tlingit culture (can use the book Haa Atxaayí Haa Kusteeyix Sitee, Our Food is Our Tlingit Way of Life. Excerpts from Oral Interviews. Richard G. Newton and Madonna L. Moss. USDA 3rd Edition). Can create rows, columns, or symbols to represent categories such as: medicine, food, spirituality, cultural identity (clan crests), basketry, dyes, soap, or fuel.

Procedure

Step 1) Making Connections: 30 minutes

- Remind students that the two oral narratives we will be learning about both contain stories of real people who complete the “hero’s journey.” This is a literary device or term that refers to characters who are profoundly changed by life’s experiences. Through the brain dominance assessment, students discovered their individual strengths and natural inclinations for learning. Present the learner’s journey concept map created by Gregory Cajete, Ph.D. (student page at the end of lesson #3).
- Explain that although students enter each class day with a certain state of being (ie. cranky, happy, tired, bored, energetic...) there is the choice of going through the circle and leaving in a new state of being. The same can be said about the class, as well as their path as scientists. Scientists use the scientific model which follows a similar pattern of hypothesizing, seeking answers, creating experiments, and sharing knowledge.
- Pair students up to discuss the results of their brain dominance assessment homework and to reflect on the learner’s model.
- Explain that they will be working in small groups on their own learner’s journey to study the coastlines surrounding Juneau. This area is Tlingit territory known as Aak’w Kwaan and Taak’u Kwaan (map provided at end of lesson #3). Explain the history of the formation of Southeast Alaska’s archipelago, and how islands created natural boundaries for distinct clans to protect and identify with natural resources. Aak’w

Kwaan consists of L'eeneidi (Raven moiety) and the Wooshkeetaan people (Eagle moiety). Taak'u Kwaan was the Yanyeidi clan (Eagle).

- The culminating activity consists of group presentations of community site selection throughout ancestral Aak'w Kwaan and Taak'u Kwaan (areas surrounding Juneau) that combine Tlingit oratory, personal lineage, GIS technology, critical thinking, understanding of natural history, systemic and dynamic changes, and global concepts.
- Hand out final scoring rubric and discuss expectations (student page).

Step 2) Assessing Background Knowledge: 10 minutes

Explain:

- Students need to know where they are going by understanding the final project rubric. One problem-solving strategy is to work backwards. On the learner's model students first need to ask questions in order to move forward seeking answers. What do students need to understand to be able to select a community site for winter and seasonal use?

Assess:

- Using their resources (the Aak'w and Taak'u map, the learner's journey, and the final scoring rubric), students need to do a quick write to answer "what do I need to know to be able to select appropriate community sites in Southeast Alaska?"
- Partner students up to compare and contrast essential factors and things to know. Have students continue to add details to their own responses.

Step 3) Building Background Knowledge: 45-75 minutes

Natural History

- Hand out the "People village site choice" diagram (student page) to each student for their binder. Explain that there are many abiotic and biotic factors that influence environments and where people choose to live. Abiotic factors are often referred to as "non-living." Tlingit culture states that everything in an ecosystem has a spirit, that even rocks are connected to one another and to us, that their nature shapes people just as people shape them. Biotic factors include what most people refer to as living, the dynamic vegetation and animals that inhabit an area.
- Use ecological field survey here if applicable.
- Combine students into small groups and hand out several blank index cards to each group. Students should work together to complete details under each bubble in the diagram
 - ❖ For example: What should go in the food category? Students should identify any known food resources they are familiar with found in Southeast Alaska: berries, different fish, nettles, mushrooms, animals, etc)
- As a class, create a large visual of the diagram that will help students identify all the factors they will need to take into consideration for community site selection. Groups can read aloud their details and someone can record each component on the class visual.
- Model the act of examining a coastline on the map and visualizing the thought process that would go into selecting a suitable site. Student groups should discuss and defend how people may need to prioritize desirable features and environmental settings.

Cultural History & Literacy

- If possible, invite a knowledge bearer in to tell *Basket Bay History*.
- Hand out *Basket Bay History* copies to each student (in Tlingit and English). Have students read aloud as a class lines 1-81. Stop before migration history begins.

Homework: *Reading for Information*

- *Homework:* Students should reread *Basket Bay History* for homework to answer the question “why did Tlingits choose to live there?” They should mark the text and annotate as they read. As students complete the accompanying worksheet for homework, they should be thinking about both the abiotic and biotic factors of Kak’w that made it a thriving community site (*worksheet to be collected*).

Lesson 4

Glaciation & Migration History

Purpose

To investigate the relationship between glaciers and people; to explore local glaciation and glacier science; to introduce students to primary resource analysis and interpretation regarding the interconnectedness of the world demonstrated by the carbon cycle; to develop the skill of gathering information from multiple resources; to assess and build background knowledge of traditional ecological knowledge; to increase listening, reading, and writing fluency.

Essential Questions

- Why do we live here?
- How do the dynamic landscapes of Alaska influence culture?

Duration

300 minutes (4 to 5-75 minute sessions)

Suggested Field Trip

5 hours

Coordinate with UAS Professor of Glacier Science, Dr. Eran Hood or Dr. Rick Edwards of the US Forest Service Pacific Northwest Research Laboratory to explore the Mendenhall Glacier and associated stream types. Dr. Hood and Dr. Edwards can present on glacier science in detail and history in the Mendenhall Visitor Center and help lead students in field exploration of two stream types converging (Mendenhall and Montana Creek). Students can test for water quality and consider factors such as rock size for salmon migration. Richard Carstensen from Discovery Southeast can also help lead a community site investigation along the Mendenhall where there used to be a L'eneidi traditional food preparation site less than 100 years ago.

Lesson Objectives: Connecting to the Standards

SC3.1 Relate carbon cycle to global climate change
SA1.2 Students recognize and analyze multiple explanations and models, use information to revise student's own explanation or model if necessary
SF1.1-SF3.1 Investigate the influences of societal and or cultural beliefs on science
R4.9 Analyze the effects of cultural and historical influences on texts.
A.2 Students will recount their own genealogy and family history
E.2 Understand the ecology and geography of the bioregion they inhabit

Academic Vocabulary

- Glacier science

- Little Ice Age
- Isostatic rebound
- Carbon cycle
- Calving rates
- Slip glaciers
- Surge glaciers
- Terminus

Materials

- Student composition notebooks
- Copy of *Basket Bay History*
- Google image of SE Alaska
- Excerpts from the scientific journal, “Glaciers and Climate Change: Perspectives from Oral Tradition.” Full version available at: <http://arctic.journalhosting.ucalgary.ca/arctic/index.php/arctic/article/viewFile/795/821>
- Migration History worksheets (Aadóo Sáyá Xá” worksheets, Kunz & Marks family tree example, and abbreviated Tlingit introduction (optional))
- Alaska Native Genealogy <http://wc.rootsweb.ancestry.com/cgi-bin/igm.cgi?db=klea>
- PowerPoint on Glaciation & Carbon Cycle (not included in this unit)
- Optional: Chasing Ice Educational Documentary (filmed on-site at Mendenhall Glacier through the Extreme Ice Survey which is currently still occurring)

Suggested Guests & Experience

- Paul Marks of GHF; Knowledge Bearer of Tlingit Glacier History (Father is Chookaneidi)
- Dr. Eran Hood of UAS; Professor of Glacier Science
- Dr. Rick Edwards of US Forest Service PNW Lab; Lead Stream Ecology Scientist
- Marsha Hotch of GHF; Knowledge Bearer of Tlingit genealogy
- The end of the lesson could be a separate class session held within a computer lab to allow students time to research their family history

Literacy Strategies

- Quick-write
- Think-Pair-Share
- Mark the Text
- Oral Reading
- Note-taking
- Debriefing

Assessments

- Pre-assessment: *Collect Basket Bay History worksheet (homework)*
- Assessment: Short-term project

Lesson Extensions

- GHF’s “Glacier Math” is an academically-rigorous lesson written by Juneau School District teacher, Paul Berg covers calculating the rate of ice loss (flow rate = distance/time)

Procedure

Step 1) Introducing Content: 30 minutes

- Begin class with a quick-write in student journals regarding what were the unique ecological conditions that made *Kák’w* an ideal village site (*why did Tlingits select the site for their community?*). Students can use their homework worksheet and copy of *Basket Bay History*. When they are finished, collect the homework.
- Hand out the outline “Siting factors for seasonal & winter villages” and give students time to compare their list of factors with the article. Students can add details to their lists and keep the worksheet for future reference.
- Explain that they are doing to continue to learn more from the *Basket Bay History* about where people were before they found *Kák’w*. Just like their families have personal lineages, Tlingit, Haida, and Tsimshian clans migrated throughout Southeast Alaska and the Interior of Canada to meet their societal and fundamental needs throughout time.
- Have class take turns reading out loud *Basket Bay History* lines 82-158 (end of oral narrative).

Step 2) Assessing Background Knowledge: 45-60 minutes

- Have students think-pair-share about the main concepts presented in the second part of the oral narrative and record responses in journals as a graphic organizer or paragraph. Pass out the google map image of the Southeast Alaska for students to orientate themselves to the oral narrative references.

Explain:

- Remind students that many oral narratives are historical accounts of observed events. Glaciation has played a large role in how people live and interact with the surrounding landscapes for the last few thousand years. Glaciers might have even impacted the way individual students’ families moved throughout Alaska, they will be researching into this possibility later.
- Present to students about local glaciation processes and the carbon cycle. The carbon cycle is a way to clearly observe how everything is connected. Just as the gases are exchanged throughout our environment and atmosphere, Tlingits see that everything has a spirit and moves in circles. Any disturbance or dramatic change in one condition will cause effects elsewhere. Southeast Alaska plays a huge role in the carbon cycle. Between the coastal interactions of land, sea, and storms, the carbon sinks of local muskegs and peat bogs, and the glaciers found around the mainland and islands who’s retreat is causing dramatic isostatic rebound and land growth. Glaciers are controversially being referred to as the canary in the coal mine, and the local Mendenhall Glacier has seen continuous and noticeable recession of the glacier’s terminus (the position of the end of the glacier). Glaciers move through internal deformation and basal slip. However, occasionally glaciers move in what is known as a surging glacier. Tlingit oral narratives, such as the story of Interestingly, the Taku

Glacier is one of the few in the world that is currently advancing in size. Discuss the differences in calving rates between tidal glaciers and inland glaciers and introduce the discussion of natural system changes and the controversy of global climate change.

Step 3) Building Background Knowledge: 30 minutes

- Hand out the excerpts from the scientific journal, “Glaciers and Climate Change: Perspectives from Oral Traditions” from the student packet. Give students time to read the highlighted sections, reminding them to mark the text, annotate, and to reread throughout. Students should also write down in their journals any questions that are generated from the article or earlier presentation.
- In small groups, students should debrief about the article (*insert Glacier Math lesson here if desired). As a class discuss opinions and thoughts generated by the text.
- Explain that why we live here extends beyond just the ecological conditions. Many people had to work hard together for us to be standing here today. Just like the *Basket Bay History*, our lives are intertwined with the landscape and our surroundings and it’s just as important to understand our cultural history as it is to study Alaska’s natural history. Even if students just moved to Alaska, it is possible for them to trace their migration history on their family’s journey to Alaska through time to better answer the question, why do we live here?
- Some students will discover that their ancestor’s migration history is directly tied to local glaciation events, just as in the oral narratives. Model completing the “Aadóo Sáyá Xá” and creating your own family tree. A sample tree of the Kunz family has been included for reference. The family trees they create should be matrilineal since Tlingit culture is matrilineal and it is beneficial for all students to understand their family history within a different social context. Since students will be presenting on Tlingit ancestral lands, they can take on the challenge of learning their Tlingit introduction. This is a great opportunity for Tlingit students to help their peers if applicable.
- If possible, Marsha Hotch can teach about Tlingit clan and Kwaan formation to better understand genealogy. Marsha can also share with students a short Tlingit introduction

Short-Term Project: Generating Questions

- *Homework:* Pass out “Aadóo Sáyá Xá” and the abbreviated introduction sheets. There are two versions, one for Alaska Natives and one for others.
- Students will complete the worksheet to answer the question: “*Why do I live here?*”
- Students will need to communicate with their families about their ancestors. If a student does not know their family, they can pick a favorite elder or community member and research their background.
- If any students are Tlingit, Haida, or Tsmishian there is an excellent free, genealogy website: <http://wc.rootsweb.ancestry.com/cgi-bin/igm.cgi?db=klea> where previous students have been able to trace back seven generations.
- Give students a time-frame to finish their research and to choose a creative way to share their personal migration history and how their family’s history is interconnected with the environment (i.e. glaciation, fishing harvest, potato famines overseas, etc).

Lesson 5

Science of Tlingit Foods & Technology

Purpose

To investigate the relationship between the environment and people; to explore local foods and the Tlingit ingenuity of ancient technology that influences today's tools; to understand basic food preparation; to introduce students to primary resource analysis and interpretation regarding the interconnectedness of the world demonstrated by the carbon cycle; to develop the skill of gathering information from multiple resources; to assess and build background knowledge of traditional ecological knowledge; to increase listening, reading, and writing fluency.

Essential Questions

- Why do we live here?
- How do the dynamic landscapes of Alaska influence culture?

Duration

120 minutes (2-75 minute sessions)

Lesson Objectives: Connecting to the Standards

SE1.1 Research how social, economic, and political forces strongly influence which technology will be developed
SA1.2 Students recognize and analyze multiple explanations and models, use information to revise student's own explanation or model if necessary
SF1.1-SF3.1 Investigate the influences of societal and or cultural beliefs on science
R4.2 Summarize information or ideas from a text and make connections between summarized information or sets of ideas and related topics or information
B.4 Identify appropriate forms of technology and their use for improving community
E.2 Understand the ecology and geography of the bioregion they inhabit

Academic Vocabulary

- displacement
- fermentation
- microorganisms
- pH
- biopreservation
- anaerobic

Materials

- Free response prompt

- Tlingit Ingenuity PowerPoint
- Excerpts from “Tleikwaani, the “berried” landscape: The structure of Tlingit edible fruit resources at Glacier Bay, Alaska” (full version at <http://ethnobiology.org/sites/default/files/pdfs/JoE/19-1/Thornton.pdf>)

Suggested Guests & Experience

- Henry Hopkins of Juneau School District; Biology teacher-boat technology and fermentation presenter for pilot class
- Helen Watkins of GHF (contractor); Knowledge bearer of Tlingit foods
- Edward Hotch of GHF; Knowledge bearer of smoking, drying, and hooligan oil production
- Fred White of GHF; Knowledge bearer of Tlingit canoes

Literacy Strategies

- Quick-write
- Mark the Text
- Oral Reading
- Note-taking
- Debriefing

Assessments

- Free Response Prompt
- Article summary

Lesson Extension

- Visit a traditional community site to research evidence of historical sites. Teach students about compass navigation and allow them to explore a pre-arranged compass course. At each compass bearing set up a small action such as guessing the diameter and height of a tree, leave a field guide for students to identify a nearby plant, have students identify manmade versus natural features.

Procedure

Step 1) Introducing Content: 30 minutes

- Begin class with a group discussion reflecting on the main themes presented and studied in *Basket Bay History*:
 - *historical community site locations*
 - *Tlingit language*
 - *Abiotic and biotic factors of community sites (influence on site selection)*
 - *Animals and vegetation used by community members*
 - *Tlingit harvest methods*
 - *Oral responses and communication*
 - *Effects of glaciation on Tlingit migration and clan history*
- Topics that the class has not explored yet in detail, but that are essential for the final project of community site selections are:
 - *navigation*
 - *trade*

- *technology and transportation*
- *food preparation and storage*

Step 2) Assessing Background Knowledge: 45-60 minutes

Explain:

- Explain that ecology is a concept that has always been understood by cultures over time. Navigation, transportation, trade, and food preparation all require a deep exploration of ecosystems and the activities that potentially cause changes to surroundings.

Assess:

- Present students the Free Response Prompt that is a modified version of questions used on the AP Environmental Science exam each year. Students should complete the free response (*to be collected*).

Step 3) Building Background Knowledge: 30 minutes

- Introduce the standard “SE1.1 Research how social, economic, and political forces strongly influence which technology will be developed”
- Technology, in turn, can have potential for great impacts intellectually, socially, for health and wellness, and on the environment. Explain that students will be examining some of the forms of technology designed by Tlingit ingenuity that affects the technology seen in the world today.
- Show “Tlingit Ingenuity & Technology” PowerPoint and have students take notes. Have guest speakers present on the topics of Tlingit canoes, adzes, fermentation, food preparation, and navigation if possible.

Homework:

- Pass out excerpts from “Tleikwaani, the “berried” landscape: The structure of Tlingit edible fruit resources at Glacier Bay, Alaska” (full version at <http://ethnobiology.org/sites/default/files/pdfs/JoE/19-1/Thornton.pdf>)
- Students should read, mark the text, annotate, reread if necessary, and paraphrase in their science journals to answer the question, “what is the relationship between the glaciers, the vegetation, and the animals/people who inhabit Glacier Bay over time?”

Lesson 6

Relationships with the Land

Purpose

To combine previous knowledge into preparation for culminating activity; to introduce students to primary resource analysis and interpretation regarding the interconnectedness of the world demonstrated by the carbon cycle; to develop the skill of gathering information from multiple resources; to assess and build background knowledge of traditional ecological knowledge; to increase listening, reading, and writing fluency.

Essential Questions

- Why do we live here?

Duration

120 minutes (2-75 minute sessions)

Lesson Objectives: Connecting to the Standards

SA1.1 Students ask questions, predict, observe, describe, measure, classify, make generalizations, analyze data, develop models, infer, and communicate
SA3.1 Conducts research and communicates results to solve a problem
SF1.1-SF3.1 Investigate the influences of societal and or cultural beliefs on science
R4.2 Summarize information or ideas from a text and make connections between summarized information or sets of ideas and related topics or information
B.4 Identify appropriate forms of technology and their use for improving community
D.3 Interact with Elders in a loving and respectful way that demonstrates and appreciation of their role as culture-bearers and educators in the community
E.2 Understand the ecology and geography of the bioregion they inhabit

Academic Vocabulary

- geographical information systems (GIS)
- layers
- aerials
- topography

Materials

- Computer Lab with GIS programming
- Access to internet for data programs:
 - <https://alaskafisheries.noaa.gov/shorezone/>
 - GIS interactive map of Southeast Alaska (prepared by Richard Carstensen)
- Flash drives for saving student images for projects

Suggested Guests

- Richard Carstensen of Discovery Southeast; to present Intro to GIS and multi-layered Southeast Alaska map

Literacy Strategies

- Think-Pair-Share
- Note-taking
- Work backwards
- Quick-write

Assessments

- Final Project

Procedure

Step 1) Introducing Content: 30 minutes

- Students should think-pair-share about the article excerpts from the night before. They should review the list of key factors.
- Introduce Richard Carstensen’s narrated slideshow on siting factors.

Step 2) Assessing Background Knowledge: 45-60 minutes

Explain:

- Explain that Tlingit, Haida, and Tsmishian lived throughout Southeast Alaska due to their comprehensive understanding of coastal ecology, geology, and oceanography.
- Introduce the concept of Geographical Information Systems (GIS). GIS is defined to: “integrate hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically reference information. GIS allows us to view, understand, question, interpret, and visualize data in many ways that reveal relationships, patterns, and trends in the form of maps, globes, reports, and charts. A GIS helps you answer questions and solve problems by looking at your data in a way that is quickly understood and easily shared.”

Assess:

- Students should work individually to explore the GIS map of Southeast Alaska. Layers to turn on and off include:
 - Tlingit place names (symbols for forts, villages)
 - Clip (to reset)
 - Glaciers
 - Estuaries
 - Snow depth
 - Forest Type
 - Anadromous streams
 - Sedge
 - Clans and Kwaans
 - 2009 aerials
 - Topographic lines

- Location of year-round site and nearby summer seasonal site for food preparation (sensitivity to bear habitat).
- Allow students to explore the coastlines of Aak'w Kwaan and Taak'u Kwaan for their preferred community site. Students can create a graphic organizer to act as a ecological factor checklist.
- When students have selected a potential community site, they should export images of the site on three different scales onto memory drives (examples of expectations available in the TEK student packet):
 - map image indicating where on Aak'w Kwaan and Taak'u Kwaan their selected site is located
 - aerial view of the community site's shoreline
 - Shorezone image from the website <https://alaskafisheries.noaa.gov/shorezone/>
- Consolidate site selections into small groups of students who chose sites near one another and have them defend their site until the best site is selected

Step 3) Building Background Knowledge: 30 minutes

- Use the book Haa Léelk'w Hás Aaní Saax'ú: Our Grandparents' Names on the Land. Edited by Thomas F. Thornton. 2012. to have students research if their selected site was traditionally a village site.
- Students should prepare their final presentation slides for a class slideshow on their selected village site. They should pick the most distinct feature of their site (canoe beach, garden, forest types, resources...) to present on.
- Teacher can prepare for final presentation event:
 - Have students sign thank you cards for guest speakers
 - Make sure all groups complete their visual slides and narration
 - Secure a venue for culminating activity
 - Invite elders, cultural specialists, and extended family members to come to the event
 - Assign students to prepare and bring traditional food and drinks for the events
 - Run a dress rehearsal with the students so they have a chance to practice presenting their work to a larger audience

Short-Term Project: Generating Questions

- *Homework:* Students should refer back to their learning concept map and reflect in their journals about what they knew, what they have learned, and how they view their surrounding landscapes.

Lesson 7

Sharing our Ideas

Purpose

To combine previous knowledge into preparation for culminating activity; to assess student understanding and ability to communicate knowledge; to assess and build background knowledge of traditional ecological knowledge; to increase listening, reading, and writing fluency.

Essential Questions

- Why do we live here?

Duration

60-90 minutes

Lesson Objectives: Connecting to the Standards

SA1.1 Students ask questions, predict, observe, describe, measure, classify, make generalizations, analyze data, develop models, infer, and communicate
SA3.1 Conducts research and communicates results to solve a problem
SF1.1-SF3.1 Investigate the influences of societal and or cultural beliefs on science
R2.9 a. Differentiate between fact and opinion. b. Express opinions about text with support
B.4 Identify appropriate forms of technology and their use for improving community
A.2 Students will recount their own genealogy and family history
D.3 Interact with Elders in a loving and respectful way that demonstrates and appreciation of their role as culture-bearers and educators in the community
E.2 Understand the ecology and geography of the bioregion they inhabit

Materials

- Completed Final Presentation Slides (can be presented as one class presentation with each group aging 3-4 slides focused on their site selections)
- Traditional food and drinks for guests to share
- Electronic equipment to present students' work
- Microphone and sound system
- Elders, cultural specialists, and extended family members

Literacy Strategies

- Generating Questions
- Rehearsal

- Oral Reading
- Group Presentations

Assessments

- Final Project Presentations (willingness to share and demonstrate respectful listening skills)

Procedure

Step 1) Preparation for Event

- Gather presentation materials
- Arrange traditional snacks and drinks for guests
- Assign students to usher guests in and help seat and serve elders

Step 2) Culminating Event

- Two students (preferably an Eagle and a Raven) introduce themselves to the group, thank the elders, cultural specialists, and panel members for helping them during the unit, thank people for coming, and invite people to have something to eat while they share their work. Show respect for Aak'w Kwaan and Taak'u Kwaan before the presentations begin.
- Students share the final presentation and show reverence to *Basket Bay History* oral narratives and their respective clans.
- Students present thank you cards to guest speakers. Guests can respond to the student presentations.
- Teacher thanks the students for all their hard work and thanks the audience for their support. Teacher encourages students to help clean up and usher elders to their transportation.