Teach Like an Elder! (Creating Student Engagement with Native Methods.)
Power Point Links!

Teach Like an Elder

https://tinyurl.com/4a5m5yeu
Native Culture Based Education in 1st and 5th Grade

My teacher was my elder, Mrs. Dorothy Mt. Pleasant Crouse from the Tuscarora Nation. The approach that she used is close to the one that I use today. She is also the one that taught me a lot about my Tuscarora heritage.
ESTABLISH RELEVANCE

Everything within a culture is relevant and that is established early.

Mrs. Crouse would have us learn something from the Tuscarora culture and then later remind us of it while we were learning topic or working on a project.

This can be extended to all cultures including modern culture.
We worked with Papa Henry 1989 until his death in 2000. He required our students to find all of the background knowledge on the Hawaiian medicinal plant that each had chosen to study prior to meeting with him. They had to build that base of knowledge prior to extending their learning. Papa confirmed that this was the way that he learned when he was young.
From 1991 – 2003, we had 19 students qualify for and win at least 4\textsuperscript{th} place at the International Science and Engineering Fair (ISEF)!
Teaching Teachers!

Hawaiian Culture Based Science,
State of Hawaii Department of Education
Windward Oahu District Workshop
with Dr. Walter Kahumoku!
Why are some students not successful? (Focus on the reasons that we can help with!)

1. __________________
2. __________________
3. __________________
4. __________________
5. __________________
Reflections on how elders taught!

1. **Build a foundation!** Give the students tasks to perform prior to lesson. Have them come back with questions. *(Quest → Questions)*

2. **Guide them** in search of the answers to their questions. Pose new questions.

3. **Have the learning be hands-on.** Observe and pose new questions involving other areas of the culture.

4. **Have the students explain, demonstrate, and innovate** with the knowledge that they have gained at the conclusion of the learning cycle.
10 Factors that we will change to help craft your curriculum to use the wisdom of the elders!

Engagement
1. **Do not connect** with the material or examples.
2. **Difficulty with vocabulary**!
3. **Difficulty with sentence structure**!
4. **Lack of confidence** as a result of a lack of previous success.
5. **Not hands on** connection.
6. Students are skimmers.
7. Students are passive vs active learners.
8. Students let the internet do their thinking for them.
9. Students are not willing to ask for help.
10. Students are not allowed to discuss the material. They are forced to work in isolation.

On Day 2 of class, I take the students through this powerpoint!
Taking the topic into the culture of your student!

a. Craft the background reading, pre-assessments, hands on activities, formative assessments with the culture of the student if possible.

b. If possible, have the culture be the central driver.

c. Put the names of the students into all parts of the lessons.

d. Use humor.

e. Use storytelling.
Taking the topic into the culture of your student!

My Chemistry curriculum is connected and based upon the koa plant project and Hawaiian culture.

The first assignment was to research and report out the best growing conditions for the endemic tree, koa (Acacia koa).

Talk to elders!!!!!!!!
2. And 3. Crafting the language and vocabulary!

What we say to Students!

Of course kimo you
Know to take the negative log
of the hydronium ion Kimo to
determine the pH of your food!
If you lose them at the beginning......
7. **Engagement - Passive vs Active Learners!**
A lot of times, no foundation is present. How do we build it or tap into it?

Take some time and **explain** Active vs Passive Learning to your students! You could put up a video or power point for them to view at the beginning of the semester to show how it would work in your class. All native learning was done in an active manner. Consequently, all students were successful.
At the end of the period, we debrief the topic and have the students explain the concept that a regular teacher would have lectured on. **No computers while doing formative learning!**

All active learning.
The Native learning roll out as adapted to Chemistry!

- I give them reading that I have edited or a link to take notes on in order to build a little foundation or I use the existing foundation. (Elder Step 1)

- We pre-assess with connections to their culture. We add to the foundation. (Elder Step 2)

- Then we do a hands-on activity that connects to the culture. This builds the foundation. (Elder Step 3)

- Then we bring in the hammer! I have them do Process Oriented Guided Inquiry where they figure out the rest of the concept in pairs. (Elder Step 4)
4. **Engagement** - Learners have a lack of confidence due to a lack of previous success.

a. Know your students! Identify those students who have struggled with their classes.

b. Make sure that you keep all of the students engaged. The means constant questioning and observing.

c. When a student shows improvement, recognize it verbally.

d. Be the cheerleader and watch the confidence grow.
9. Engagement – Students are not willing to ask for help.

Day 1 - Applaud each student that asks for a clarification of a vocabulary word or sentence structure or an unfamiliar example.

Applaud the student for seizing control of his or her learning.

Reward the student a piece of candy. You will have some students that ask just for the candy but the most important thing is that the barrier is removed.

Establish the culture! Set the expectation!
Familiar Phenomenon
Pre-assessment! Initial Engage.

1. Students have built a base the night before.
2. Phenomenon is given and an explanation is proposed. (Develop argumentation skills.)
3. Common misconceptions are used for some of the incorrect explanations.
4. Make it fun!
5. Make it personal.
Little Spencer puts pork shoulder and uala (sweet potato) into the imu and cooks it over night.

His friends come in to have some kalua pork and sweet potato from the imu. The kalua pork is cool enough to eat but the uala is still scalding hot and he gets a bit burned! What happened?

Instant Answer Judah decides to offer an explanation as to what is happening.

Instant Answer Judah: The kalua pork was getting hit by the wind more than the uala.

Just Brilliant Joey: No way! The uala was heated to a higher temperature than the kalua pork.
Kalua Pork Loving **Nafe**: I think that the kalua pork must have been covering the uala.

**Krazy Kaila**: I think that the uala must have absorbed more heat therefore will take longer to cool down.

Which person do you agree with? **Explain your thinking. Develop your argument!**
Engagement From the Beginning!
Hands on investigation that taps into prior knowledge!

5. and 10. Engagement – Done in Pairs and hands on.
Predict-Explain-Observe (PEO)

The students must predict and explain what they think will happen when they add individual components of Hawaiian salt to water. $\text{NaCl}$ is part of the Hawaiian salt harvested in the poho pa`akai.

**Predict:** Endothermic or Exothermic when added to water?  
**Explain your reasons for your prediction**

Actual observation:  Endothermic or Exothermic

Also do the same procedure for $\text{CaCl}_2$ and $\text{NaHCO}_3$. 
Predict Explain Observe!
Tiny urls for: Culture Based POGIL and Original POGIL

Hawaiian version that has been modified to the culture of the students:

https://tinyurl.com/vm97x5ba

Original version that is from the POGIL team:

https://tinyurl.com/w4v5u72x
Leilani heads down to the end of Chain of Craters Road by the ocean to clear her head and prepare for her classes. This is her usual Saturday morning practice. To get herself ready to study, she practices a little hula. While practicing, she notices that when she first got there, the water in the puddle was the same temperature as the lava that she was practicing on. After about an hour, the water temperature had increased a little bit but the lava was very hot. She wants to know why. She also noticed that the next morning, they are both cool again. What is going on? We must explore!
POGIL continued

Now when Huaka heats some lava, the temperature of that lava increases. Will the same amount of energy cause lava and wai (water) to have identical temperature increases? Will the same amount of energy be needed to cause identical temperature increases in different amounts of the same substance? In this activity you will explore how mass, temperature, heat energy, and the type of substance are related.
Model 1 – A Piece of Lava Before heating

After heating each for 5 minutes at a rate of 30 Joules per minute to EACH container!

The large lava has twice as much mass as the small lava.
1. In Model 1, which lava rock has more grams of rock?

2. Consider the process described in Model 1:
   
   a. How many joules of energy were added to the small lava rock? (Check the data that you have in the boxes!)

   b. How many joules of energy were added to the large lava rock?

   c. In which lava rock (small or large) gained more energy or did both gain the same amount? Explain your reasoning.

   d. For each rock, include whether the temperature is expected to increase, decrease or remain the same after heating. Explain your reasoning.
Please fill in the data from the POE that you just completed and calculate $q$ in joules which equals the Heats of Reaction that you did!

$$q = m \times c \times \Delta T$$

<table>
<thead>
<tr>
<th>Compound</th>
<th>Joules</th>
<th>g H$_2$O</th>
<th>$4.18 \text{ joule/g}\cdot\text{oC}$</th>
<th>°C</th>
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</thead>
<tbody>
<tr>
<td>NaCl</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NaHCO$_3$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CaCl$_2$</td>
<td></td>
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</tbody>
</table>

Please notice that if heat is given off, the $q$ will be (-). If heat is absorbed by the reaction, $q$ will be (+).
Hawaiian Culture Based Labs

Koa/ʻIliahi/Hapuʻu/ʻOhiʻa Forest – Solutions, pH, Ions, Sustainability

Native Woods – density lab

Poho Pa`akai (Salt Drying Pond) – Reaction types, Acid –Base Titration, Gas Laws, Thermodynamics, Data gathering for future introductory assessments

Hawaiian Salt Components – Heat of Reaction (Thermodynamics)

`Olena as an Indicator – Weak Acid/Strong Base Titration, Le Chatelier’s Equilibrium

Hawaiian Food Lab – Heat of Combustion (Thermodynamics)

Making a Hawaiian Salt Component – Empirical Formula

`Olena components – Spectrophotometry of components
Links

World Class Native Education Lesson Template

https://tinyurl.com/5atcjsx45

Quick Guide for World Class Native Culture Based Education

https://tinyurl.com/fx34zshu
Resource Links!

**Hawaiian Culture Based Lessons**
Waihona.net
https://waihona.net/#/

**Cultural and Student Growth Data**
Kanoe Wilson, Kamehameha Schools
Contact me if interested.
Connecting Native Culture to each discipline.

My Chemistry curriculum is connected and based upon the **koa** plant project **and** Hawaiian culture.

The first assignment was to report out the best growing conditions for the endemic tree, *koa* (*Acacia koa*) that they obtained from elders.

**Why connect this to other classes?**

Subjects connected to:
- Hawaiian Culture
- Ethnobotany/Biology
- Chemistry
- Earth Science
- Speech
- English Language Arts
- Social Studies
- Art
Going forward as educators!

What are some strategies that you could use to develop and implement culture-based education in your classroom?

What strategies do you use to increase engagement?
American Chemical Society National High School Final Exam in my 10th grade Chemistry Classes.

<table>
<thead>
<tr>
<th>Year</th>
<th>KSH students</th>
<th>KSH avg</th>
<th># of KSH above NA</th>
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<tbody>
<tr>
<td>10-11</td>
<td>83</td>
<td>70%</td>
<td>30</td>
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<tr>
<td>11-12</td>
<td>87</td>
<td>71%</td>
<td>33</td>
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<td>12-13</td>
<td>85</td>
<td>83%</td>
<td>62</td>
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<tr>
<td>20-21</td>
<td>63</td>
<td>No Test COVID-19</td>
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<tr>
<td></td>
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<td>National Average (NA) = 75%</td>
<td></td>
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</table>
Student plan to take forward!

1. What is my plan to prepare to be an active learner?
   (Google topic before class? Check for relevance and connection to culture?)

2. What is my plan for getting my questions answered?

3. What is my plan for test preparation?

4. What is my plan for resource organization?

5. What is my plan for discussing the material with another student?
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Challenge!

1. What is your plan to share this?
2. Who will you share this with?
3. Who will you mentor?
4. Will you organize a group of educators and tribal members to work on this together?
5. Will you share this with your administration?
6. Will you share this with students and family members
Recognition that Culture Based Education is Second to None!

•The development of this Hawaiian Culture Based Curriculum with all standard Chemistry concepts being integrated resulted in the following:

   Joel Truesdell
   Kamehameha Schools Hawai`i Campus
   2017 National Science Teachers Association Shell Teacher of the Year!