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WEATHER, CLIMATE, CLIMATE CHANGE AND ITS CAUSES IN AMERICAN SAMOA
- **Five lessons** by Tearina G Asiata & Tavita Togia, National Park of American Samoa

Closing Comments: Pauline W. U. Chinn

Zoomy Science Photos by Mrs. Faatamalii L. Migo
Note: each teacher received a Zoomy provided by Dr. Chinn’s award for professional development. A Zoomy is a small handheld electronic microscope that takes photos and videos magnified 43 times that can be showed live or saved and shared via connectto to laptop computer and projection system.
PLANTS AND ANIMALS OF AMERICAN SAMOA, LESSONS BY AND FOR TEACHERS

FOREWORD

Why Place-Based Science In American Samoa? Netini Sene

People often struggle to think of ways to use the local community and environment to teach concepts across the curriculum. How can we emphasize hands-on learning and provide real-life learning experiences? I think this place-based approach to education will increase academic achievement and assist students in developing stronger ties and deeper bonds to their community.

The idea of teaching of Place-Based science to a cohort of Early Childhood Education (ECE) Teachers was very appropriate. Their enthusiasm and energy was a reminder that a focus on STEM and hands-on learning can and should start at a very young age. Even as young as Kindergarten, students thrive when exposed to new ideas, challenges and the opportunity to explore and experiment with the world around them. This will also enhance students’ appreciation for the natural world and increase their commitment and love for the environment.

We want to connect our teachers and students to the engineers, the local high chiefs, and environmental educators and bring them into the schoolyard and the four walls of the school. And we want to go outside to learn from them. This is where we belong.

PREFACE: Pauline W.U. Chinn

ITE 583 Practicum in Curriculum Development: Natural Science helped ECE, elementary, and secondary science teachers upgrade their physical, earth, and biological science content knowledge and develop standards-based STEAM lessons (science, technology, art, mathematics) connected to students’ lives, cultures, and communities. On the first day, Mene Taua led a discussion and drew a poster showing that learning about flowers can lead to richly connected learning.

Place-based science education (PBSE) is simply project-based science education in the context of familiar activities and students’ communities and cultures. Lessons about American Samoa’s plants and animals show that familiar, community resources are treasures readily available for integrating science, technology, engineering, art, mathematics, and social studies.

Teachers chose a plant or animal that would be familiar to their students and community, conducted research, interviewed elders, and developed a unit they planned to teach. They created posters illustrating key ideas and relationships in their lessons, and brought in materials to share their lessons with peers. Each lesson explored different place and culture-based resources and illustrated knowledge gained from partnerships with elders, businesses, post-secondary resources and government agencies.
A lengthy list of acknowledgments thanks those who generously shared knowledge with teachers.

We hope you find PLANTS AND ANIMALS OF AMERICAN SAMOA: A BOOK OF LESSONS BY AND FOR TEACHERS useful for your instruction.
INTRODUCTION

Eensy Weensy Spider is a STEAM Lesson!!! By Pauline W. U. Chinn

STEAM lessons can be developed from traditional Samoan songs, stories, and practices the same way as in Eensy Weensy Spider. Teachers show how this works in the posters and lessons that follow. Be a creative curriculum developer as you help to conserve and transmit Samoan culture, language, and knowledge in your school and community.

The eensy weensy spider went up the waterspout.
Down came the rain and washed the spider out.
Out came the sun and dried up all the rain.
Then eensy weensy spider went up the spout again.

1. What **force** is in the song? (gravity)
2. What **animal** is in the song? (spider) What 2 kinds of **bioengineering and biotechnology** has it evolved? (1. It produces sticky and non-sticky silk, spins a web to catch insects. 2. It produces poison, injects it through hollow fangs) How does this enable it to live? (It is a predator and carnivore that catches, kills, and eats insects.)
3. What **math** is in the song? (8 legs of spider, temperature rises)
4. What **directions** are in the song? (up, down)
5. What **cycle** is in the song? (Water cycle) Draw and label the parts of the cycle, include the sun, use English words below and Samoan words.
6. What is the human **technology and engineering** in the song? (Waterspout) What purpose does it serve? (Directs rainwater to a place where it flows away or is stored.)
7. What kinds of **energy** are in the song? See words below. (Energy converts from one form to another: solar, heat, kinetic, potential, light, nuclear fusion)
8. How does the spider get its energy? (Eats insects, chemical energy)
9. Energy converts from one form to another: What is the **source of energy** for all energy changes in this song? (2 answers: sun-solar, sun-nuclear energy)
10. Draw an **energy conversion chain** of 4 steps with sun, spider, and 2 more steps. Many correct answers are possible. (sun, grass, grasshopper, spider)
11. Draw an **energy conversion chain** starting with the **sun** and **ending with a person** of 3 steps, 4 steps, and 5 steps. Many correct answers are possible. (sun, plants, vegetarian; sun, plants, cow, carnivore; sun, grass, grasshopper, chicken, carnivore)
12. Put it all together with ART: **Draw and label a diagram** that shows how nuclear reactions in the sun drive water and carbon cycle from photosynthesis to decomposition, and energy conversion

**WORDS FOR LABELING YOUR DIAGRAM**

- herbivore (plant eater)
- predator (catches and eats animals)
- carbon dioxide
- oxygen
- omnivore (eats plants and animals)
- carnivore (eats animals)
- evaporation
- gravity
- precipitation
- chemical (food, fuel)
- energy
- photosynthesis
- heat energy
- kinetic energy (movement)
- solar energy
- light energy
- nuclear energy
- producer (uses sunlight to produce sugars, starch, proteins, oils)
- decomposer
- condensation (vapor to liquid e.g., cloud formation)
Look how much science, math, engineering, and technology is in *Eensy Weensy Spider*! Later in Honolulu, a teacher/PhD student, a former engineer for NASA said her team was given this nursery rhyme to help them think outside the box. We’re in good company!
THE ANIMALS OF AMERICAN SAMOA

BAT FAMILY (*PTEROPODIDAE*): PE’A

**General Samoan Name:** Pe’a  
**Samoan Names of Three Different Species:** Pe’a Vao, Pe’a Fanua & Pe’ape’avai  
**English Name:** Fruit Bat/ Flying Fox  
**Scientific Family:** Pteropodidae  
**Genus & Species:** *Pteropus samoensis*, *Pteropus tonganus* & *Emballonura semicaudata*
**Family history**: Bats are a sign of good fortune, fertility and long life in some parts of the world such as China. In the 16th century, bats were related to devils in England because they were very different from all the other mammals. They flew at night and hung upside down. Today, the poor bats are feared and misunderstood by some because they are associated with vampires in the movie industry.

Three species of bats are the only native mammals that populate the Samoan islands. *Pteropus samoensis* or pe’a vao has a dusty black look with grayish head and brown shoulders. *Pteropus tonganus* or pe’a fanua has a black head and body with a creamy yellow band on its neck and shoulders. These colors are important structural adaptations that camouflage the bats. The colors allow them to blend in with dry banana leaves and also the stems and branches of other trees. Bats have a tendency to feed on the juice or pulp of fruits even though they are called fruit eaters. They have strong jaws and long teeth suited for eating fruits and squeezing the juice out. Bats chew on the food and suck out the juice then release pellets of pulp as ejecta. Ejecta are dry materials that help scientists pinpoint specific plants that act as nutritious food items for the bats. The symbiotic relationship between bats and the plants that they feed on is mutualistic as both species benefit. The bats receive food and habitat from the plants while the plants pollen is being transferred from one tree to another. The seeds of the plants are also dispersed to prevent competition for food, water and space when the seeds germinate.

**Samoan Story**: Told by Taofiaseaasono Reupena Aiono, a matai from Fasitoouta, Upolu Samoa in a personal interview on August 13, 2015.

Na usu Leutogitupa’itea le alo o Pouliofataoletagaloa i le tupu o Toga, o Tui-Toga Manaia. Ao nonofo Leutogitupa’itea ma le tupo Toga, sa iai foi le isi toalua o le tupu e sau mai foi i Toga. Na maua le tama a le fafine Toga i le tupu ae le fanau Leutogitupa’itea e pa. Ina ua fanau le tama a le fafine Toga, na amata ona fua ai le mafaufau o Leutogitupa’ai. I se tasi aso, na fai ai le fafine Toga ia Leutogitupa’itea latou te o ma lana pepe e taele i le vai taele. Ina ua latou taunu i le vai taele, na fai atu le fafine Toga ia Leutogitupa’itea e tago e si si ana tama ae sei taele muamua. O iina, na mafaufau ai Leutogitupa’itea o le a ia fa’ao le oti ile suli o le fafine Toga. O lea na ia vaneina ai se tianiu ma tuatu ai le a ulu ole pepe. Na ee leotele le pepe ae tamoe Leutogitupa’itea ma ave le pepe i le fale. Na ia faataaatia le pepe ma na tafe mai le toto i lona ulu ma maliu ai lava. Ina ua maua atu e le fafine Toga lana tama, sa ia iloa ai o loo iai se pu i lona ulu ma sa ia tuuina atu se faiioga ile tupu Toga o Leutogitupa’itea ua ia tagatavaleina si ana tama. Na faalogo le tupu Toga ile faiioga ma faatonu ana auauna e faaputu ni fafie, ma saisai Leutogitupa’itea agai i se fa’atua e susunu. Ina ua amata mumu le afi, sa alu atu se taulaga pe’a tele lava ma fai a latou feauvai i lugu ale a fai ma pe ai. Ina ua vaai atu le tupo Toga e le oti Leutogitupa’itea, sa ia toe faatonu ana auauna e ave ia ma tuu i se nuu le aina. Ina ua taunu Leutogitupa’itea le motu tufua, sa ia iloa ai e nao ma’a, oneone ma se aitu o loo maua i totonu o lelei motu. E lei aia e le aitu Leutogitupa’itea ona sa ia manatu e leai ni meaai ma ni vai e ai ai Leutogitupa’itea, o lona uiga e le umi lava ae oti. Peitai, sa toe o atu foi taulaga pe’a ma ave atu ana meaai. O meaai e aofia ai le ifi ma le ulu ma fafie e fai ai le meaai a Leutogitupa’itea. Na maofa le aitu ina ia vaai atu o loo tausami mai Leutogitupa’itea. Na alu aso, ae sau aso, ona alu atu lea o le tupu o Uea ma ave Leutogitupa’itea e fai ma ana masiofo. Na fanau ai loa se tama a Leutogitupa’itea e suafa ia Fa’asega. Ina ua matua le tama, na naunau Leutogitupa’itea e alu i lona aiga i Savaii, Samoa ma ave ni igoa taua se tolou. Ole Tonumaip’e’a, Taualili ma le Tilomai. O le Tonumaip’e’a e mafa
A Samoan woman named Leutogitupa’itea, daughter of Poulioftataoleragaloa lived with a Tongan king by the name Tui-Toga Manaia. The king also had a Tongan wife who bore him a child. Leutogitupa’itea envied the Tongan woman because she was barren. One day, the Tongan woman asked Leutogitupa’itea to go with her to the bathing place. Upon arrival, the Tongan woman asked Leutogitupa’itea to hold her son while she took a bath. While holding the boy, Leutogitupa’itea tore a rib from a coconut leaf and forced it into the poor boy’s head. The little boy started screaming and Leutogitupa’itea rushed him back to the house where he bled to death. The Tongan woman soon found out that there was a hole in her son’s head and she blamed Leutogitupa’utea for it. The king Tui-Toga Manaia concluded that Leutogitupa’itea was guilty so he asked the villagers to collect firewood and make a big oven to burn her. The villagers piled up the wood around a fetau tree (Calophyllum inophyllum) and tied Leutogitupa’itea to the stem of the tree and lit the pile of woods. When wood started burning, a big swarm of bats came and urinated on the fire so that it died. Tui-Toga Manaia realized that his punishment had failed, so he ordered Leutogitupa’itea to be shipped to a desolate island. The remote island did not have plants but only rocks and sand and a aitu or demon. The demon did not harm the Leutogitupa’itea because he knew that she would soon die from hunger and thirst. However, when she was in great need of food and drink, the bats came and brought her fruits of the ifi (Inocarpus fagifer) and breadfruit trees along with wood so that she could cook her food. While Leutogitupa’itea was eating, the demon looked at her with amazement because he could not figure out how she was able to obtain food. While Leutogitupa’itea was eating, the demon looked at her with amazement because he could not figure out how she was able to obtain food. A king from Wallis and Futuna passed by the desolate island where Leutogitupa’itea and the demon were and the king took Leutogitupa’itea as his wife. Leutogitupa’itea bore him a son whom she called Fa’asega. When the boy matured, Leutogitupa’itea sent to see her family on the island of Savaii in Samoa. Before the boy left, Leutogitupa’itea gave him three names to take to her family. Tonumaipa’a, Tilomai and Tauiliili. Tonu-plan, mai-from, pe’a-bats. Tonumaipa’a meant the right thing which was the rescuing of Leutogitupa’itea by the bats that urinated on the fire. Tilomai meant looked on by the demon who stared at Leutogitupa’itea while she was eating. Tauiliili meant covered with small rocks or Leutogitupa’itea’s food was cooked by using small rocks because there were no leaves on the desolate island. The matai titles Tonumaipa’a and Tauiliili are still known in the village of Neiafu in Savaii. The sa’o tamaitai title (princess) for Tonumaipa’a is Tilomai.

See Figure 1 Faalupega o le alalafaga o Neiafu, Savaii Samoa. Ceremonial salutation with local courtesy titles for the village of Neiafu in Savaii, Samoa. The titles Tonumaipa’a, Tauiliili and Tilomai are included in the salutation.
Source: Tusi Faalupega o Samoa Atoa by Methodist Church in Samoa

Business: Movie Companies have already filmed movies such as Batman to relay the message that people should not be scared of bats but treat them as their source of protection. Umbrella and Raincoat companies should use bats as their mascot since the bats can fold their wings around and protect them from danger.

Anything Dangerous? The Samoan fruit bats sometimes feed on some of the fruits that we grow for ourselves but they help sustain the health of our rainforests. When captured, some bats might try to bite as a defense mechanism.

LESONA (Lesson Title): Let Us Become Bat-ologists!

(Bat-ologists should know the benefits of bats and how to maintain their population)

MATĀ’UPU (Subject): Science
PLANTS AND ANIMALS OF AMERICAN SAMOA, LESSONS BY AND FOR TEACHERS

VASEGA ‘AMATA (Grade): 10

TIME SPAN: 1 hour & 15 minutes

GOALS OF THE LESSON: Write 1 or more primary goals of the lesson

To help students understand the benefits of bats and list ways to increase and maintain the bat population in American Samoa

1. MATĀTI’A MA ĀLĀFU(A (ASDOE CONTENT STANDARD(S):)
   MATĀTI’A(Stand): Life Science
   ĀLĀFU(LAUTELE (Common Core Standards): See Standard
   ĀLĀFU (Standard): Standard 8: Students inquire how organisms and populations of organisms obtain resources from their environment.
   Benchmark (La’asaga): Bio2.8.1: Investigate the interdependent relationships in ecosystems

2. SINI FA’AMOEMOEINA/TANU’UGA AUTŪ (Objectives): Upon completion of the RAFT (Role-Audience-Format-Topic) activity SWBAT
   A. List at least 2 benefits of bats in the ecosystem
   B. Describe how they can help increase and maintain the bat population in American Samoa.

C. SU’ESU’EGA (Assessment Task): Ask the students
   1. Are bats important? Please explain
   2. Why should you be concerned about the bat population?

D. VA’AI G LaUTELE (Overview)/FA’AILOA LE ILOA (Prior Knowledge): Large flying foxes or fruit bats are the only native mammals of American Samoa. There are three species of fruits bats and they are known as pe’a vao, pe’a fanua and pe’ape’avai. Bats live up to 20 years if they are held in captivity. Natural disasters might decrease their life spans in the wild. Bats feed on the pulp or juice of fruits and they help scatter seeds and pollinate flowers.

E. FA’ASOLOGA O A’OA’OGA (Instructional Procedures)
   a. GAIO’IGA TATA’I (Focusing Event): Sing the song and do the actions “Timu ma’ama’a faimalaga loa le pe’a, sue se laau e fua tele naau, muamua taamilomilo ae mulimuli tautau, upe vae tasi ae faaeto le laulau.”
b. **FA’ATA’ITA’IGA FAIĀ’OGA (Teacher Model): (I Do):** Teacher reviews previous lesson/objective (supposedly the guest speaker from National Park and lecture using the family history part of the lesson (page 1). Teacher divides the class into groups of 5. Teacher tells the students that they are RAFTing today! R-Role, A-Audience, F-Format, T-Topic. The students’ role can be the teacher, student, park ranger or community member. Their audience can be student, teacher, governor or senate and fono members. Their format can be letter to the editor, skit, poster, flyer, song, short story, poem or bumper sticker. All topics should be about the benefits of the bats or how to conserve them.

**Figure 2:** Rubric for Grading the Bat-ologist RAFT

<table>
<thead>
<tr>
<th></th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Content</strong></td>
<td>Appropriate concept properly explained. Science specific connection made. Concept is accurate, comprehensive and well supported.</td>
<td>Adequate explanation. Science connection present but could be developed further.</td>
<td>Poor explanation. Inaccurate and misinterprets the science connection.</td>
<td>No analysis of science topic. No explanation. No science specific connection.</td>
</tr>
<tr>
<td><strong>Delivery</strong></td>
<td>All group members participate. Confident, poised enthusiastic fashion. Eye contact. Volume and rate varies to add emphasis and interest. Pronunciation is very clear. Few “ahs,” “uhms,” and “you knows.”</td>
<td>One member of the group does not participate. Volume is too low or too loud. The rate is too fast or too slow. Eye contact. Enunciation is clear. Few “ahs,” “uhms,” and “you knows.”</td>
<td>More than 2 members of the group do not participate. Volume is too low or too high. The rate is too fast or too slow. Some eye contact. Enunciation is unclear. Too many “ahs,” “uhms,” and “you knows.”</td>
<td>Only one group member presents the RAFT. Volume is so low and the rate is so fast that you cannot understand most of the message. The enunciation is very unclear. No eye contact. The speaker appears uninterested.</td>
</tr>
<tr>
<td><strong>Length of</strong></td>
<td>Within allotted time</td>
<td>More or less of allotted time</td>
<td>Five minutes over time of allotted time</td>
<td>Too long or too short, ten or more minutes above or below the allotted time</td>
</tr>
<tr>
<td><strong>Presentation</strong></td>
<td></td>
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</tr>
</tbody>
</table>
c. FA’ATA’ITA’IGA/FA’ATINOQA FA’ATASI (Guided Practice): (We do)

Ask students- If our class is assigned to create a bumper sticker to conserve bats, what words would we put on the sticker? R-Student, A-Everyone who sees the stickers, F-Bumper Sticker, Topic: Wording of the Sticker (Maybe a picture of a bat with a saying “Protect It!” or a picture of a bat with a question “Leave It or Ticket?” Teacher also shares the poem.

R-Student, A-Parents, F-Poem, Topic: Did you know?

Fruit bats pollinate trees,
Which is a tireless service that is done for free.
Fruit bats also disperse seeds,
Which replace plants that have aged or died from a certain disease.
Let us not cut down the bats favorite fruits,
Which are the asi, aoa, ifi, tava, mango and ulu.
Please stop shooting the bats,
But treat them with love and care just like you would with your house cat.

d. FA’ATINOQA TA’ITO’ATASI (Independent Practice): (You do)

Groups of three work on their RAFTs. Make sure to check the rubric to see what the expectations are. Teacher walks around and monitors discussion and creation of final product.

FA’AI’UGA (Closure) – Group presentations. Teacher uses the rubric to grade the presentations. Teacher asks the students to share what they have learned in class today. Class stands up and sing the Focusing Event Song one more time. If there is enough time, give the students the following worksheet to complete and collect it at the end of class.

Figure 3: Worksheet on Bats

1. What is the role of a fruit bat in nature?
2. Briefly explain what you can do in your community to increase and maintain the bat population.

F. MEAFAITINO (Resources/Materials, References):
Markers, poster boards, line papers, glue, tape, scissors, notes, crayons, rulers, pens, pencils.
1. Names

- Samoan: Akule
- English: Big-eyed Scad
- Kingdom: Animalia
- Phylum: Chordata
- Class: Actinopterygii
- Order: Perciformes
- Scientific Family: Carangidae
- Subfamily: Coregoninae
- Genus species: Selar Crumenophthalmus

2. Family history:

The big-eyed scad is an oceanic fish found in tropical regions around the globe. Other common names include purse-eyed scad, google-eyed scad, akule, chicharro, chirrito ojon and coulirou. The big-eye scad is fished commercially both for human consumption and for bait.

3. Cultural Uses (Past, Present and Future Potential):

Fagasa village is one of the villages on the Samoan island that carries out a traditional way to harvest the “akule”. It is said that when the village is getting ready to harvest the akule; men, women, and children, old and young must take parent in the akule harvesting. The only types of person that are not allowed in the harvesting of the akule are the ladies who just gave birth, and the sick. No cars are allowed to pass in front of the harvesting site, the same goes to all the by passers. It is a must for everyone to get involved in the akule harvesting. There are rules when harvesting the akule, you cannot eat the akule raw while harvesting the akule. When the harvest is done, and all the fish has been shared amongst the villagers, you cannot sell the fish on roadsides, or to family members, by selling the fish will lead to no more fish. No cameras are allowed during harvesting time.

4. Precautions: Parasites of the big-eye scad include the Philometrid Nematode Philometra Selaris, which lives inside the ovary of the females.
LESONA (LESSON TITLE): AKULE/ BIG-EYE SCAD

MATĀ’UPU (Subject): Science (Parts of the akule)

VASEGA ‘AMATA (Grade): K-3 and K-4

TIME SPAN: 32–40 hours a week (includes field trips)

GOALS OF THE LESSON:
- a. Students will be able to identify different parts of the fish.
- b. Students will be able to draw pictures of the fish.
- c. Students will be able to identify letters of the word “fish”

MATĀTI’A MA ĀLĀFUA (ASDOE CONTENT STANDARD(S)):
1. ĀLĀFUA (Standard): VA5. Reflects upon and assesses the characteristics and merits of their work and the work of others.
2. BENCHMARK (La’asaga): The student uses developmentally appropriate artistic terminology to tell what they like about the artwork they analyze.
3. SINI FA’AMOEMOEINA/TANU’UGA AUTŪ (Objectives): Students will use language to express thoughts and needs explore visual arts.
4. SU’ESU’EGA (Assessment Task): The teacher will have students work on different work areas and especially at the fine art where students will be able to draw their pictures of what they have learned so far from the lesson. Ask students about what picture they are drawing and the name of their picture or art.
5. VA’AIGA LAUTELE (Overview)/FA’AILOA LE ILOA (Prior Knowledge): When saying the word fish, the students will share where they saw the fish. Students will be able to share what they know about fish, but the students cannot say the actual name of the fish.
6. FA’ASOLOGA O A’OA’OGA (Instructional Procedures)
   - b. GAIO’IGA TATA’I (Focusing Event): The teacher will prepare a rolled pictorial chart already posted with pictures of corals and seaweeds and sand. Post the chart on the wall where students will be able to see and explain to the students that the akule swims in a school, show the students another separate photo of akules swimming in schools.
   - e. FA’ATA’ITA’IGA FAIÄ’OGA (Teacher Model): Using a blank sheet of paper, draw my akule and color my akule blue or black, then post my picture of the akule on the rolled pictorial chart. Let the student know where to post the pictures of akule on the rolled pictorial chart. Make sure to use the scissors to cut your drawing of the akule.
   - i. FA’ATA’ITA’IGA/FA’ATINOGA FA’ATASI (Guided Practice): have the students draw and color their pictures of akule and tell the students to cut their pictures and post it on the rolled chart.
o. FA’ATINOGA TA’ITO’ATASI (Independent Practice): let the students know that akule are not the only kind of fish in the ocean. Let them draw more pictures of fishes and continue to make their own pictorial chart.

FA’AI’UGA: Using the pictorial chart provided by the students, ask the students about the work they did. Have the students stand and explain to the whole class what they see in the chart, and tell everyone the parts of the akule teacher will use the puzzle of the akule being cut out to identify the parts of the akule for the students to see.

7. MEAFAITINO (Resources/Materials, References): The internet, rolled paper for chart, crayons, markers, picture of the akule, scissors, and tape.

8. ILOILOGA (Evaluation): Using a camera, record the artwork of the students and using the daily observation. Write down what the students are saying.

9. TOE-MANATUNATU (Teacher Reflection):

O ā Vaega sa lelei/manaia/maua e tamaiti? (What worked?) Providing live fish for show and tell really interests the students, along with the field trip.

O le ā se mea na lē lelei ona fa’atino? (What didn’t work?) Verbally delivering the lesson. This bored the students.

E fa’apefea ona toe fa’alelia/suia mo le aga’i i luma? (How would you improve this lesson?) If there are no field trips, have someone who specializes in fish talk about the akule.

10. GALUEGA E ’AVE I LE FALE (Homework): The teacher will give notes to the parents, asking them to further educate their child in the ways of the akule and fish, in general. This allows the students to get more involved in nature outside of school.
PIG FAMILY (SUIDAE)

Taumate Patea (Wild Boar), Pauline Silao (Bearded pig), and Tasi Leota (Domestic pig)

Names
- Samoan: Pua’a Aivao
- English: Wild Boar
- Kingdom: Animalia
- Phylum: Chordata
- Class: Mammalia
- Order: Artiodactyla
- Scientific Family: Suidae
- Genus species: Sus
- Specific Name: Sus scrofa

Family history:
The wild boar is a native of Europe, Northwest Africa, and is also found throughout Asia. The wild boar has many relatives, but only have a couple that are really closely related to it and they are the Domestic Pig, Red River and the Bearded Pig.

There are a few wonderful and most interesting scientific facts about the wild boar. One, they are nocturnal. Wild boars are most active when the sun has long set. Two, wild boars are omnivores. They prey on berries, roots, and worms for food. That’s not all. They also eat meat! Of course, omnivore means something that eats both plant and meat, or basically anything. Three, the life span of a wild boar is 15 to 20 years and has an average litter size of 5 piglets. The last one is that wild boars weigh 176 pounds to 386 pounds and can run 30 miles per hour!

Story of introduction to Samoa:
There is a legend that explains the introduction of pigs into Samoa from Fiji. According to legend, a Samoan voyager who visited Fiji introduced pigs to Samoa. This legend tells of the first encounter between the Samoans and the Fijians. The Samoan voyager traveled to and arrived in Fiji. The Fijians prepared a feast for the voyager. One of the dishes of the feast was pork. The Samoan voyager wanted to take pigs back to his country but the Fijians refused. They told the Samoan he could take dead pigs as food, but he could not take live pigs. The Fijians were adamant in their decision not to export live pigs. However, the Samoans crafted a tricky
plan to avoid the Fijians rule. They went and roasted two large pigs and stuffed them with live piglets, unbeknownst to the Fijians. The Samoan went back to Samoa with two dead, cooked pigs stuffed with live baby pigs, and no one was the wiser.

**Cultural Uses (Past, Present and Future Potential):**

In the past, present, and hopefully the future, pigs have played a very important part in Samoan heritage when it comes to special occasions. The domestic pig, relative of the wild boar, was killed and cooked for a meal, and the distribution of cooked parts of the pig presents a distinction of the closest thing Samoa has to royalty. The wild boar, however, has only been living in the wild keeping away from civilization. Every now and then, there would be a hunt for the swine. Aside from that, the wild boars stay hidden inside the rainforest. When men hunt for wild boars, they use sharp knives, dogs, and sharp wits. A video of a wild boar being hunted by a pack of brothers and their friends and their dogs show how the men and animals worked together to corner the wild boar. They ran for a while until they caught the boar. It’s amazing how they used cameras to record the hunting so that others may see the way they hunt wild boar and some of the characteristics of the animal in its fight or flight mode.

**Precautions:** Because of the fact that the wild boars very much prefer the rainforest to human society, they do not pose much of a threat besides the promise of a fair game of hunting for those interested in such activities. They are not dangerous to society because of their exclusion, and so far, they have caused no diseases or illnesses to anything in the form of living.

**LESONA (LESSON TITLE): WILD BOAR GALORE!**

**MATĀ’UPU (Subject):** Reading

**VASEGA ‘AMATA (Grade):** K-3 and K-4

**TIME SPAN: 32–40 hours a week (includes field trips)**

**GOALS OF THE LESSON:**

- d. Students will know the difference between wild boar and the domestic pig they usually see and eat.
- e. Students will appreciate wild boars, even if they are not within society.

**MATĀTI‘A MA ĀLĀFUA (ASDOE CONTENT STANDARD(S)):**

**MATĀTI‘A (Strand):**

ĀLĀFUA (Standard):

Benchmark (La’asaga):

ĀLĀFUA LAUTELE (Common Core Standards)

11. **SINI FA’AMOEMOEINA/TANU’UGA AUTŪ (Objectives):** Students will make lists and understand the pros and cons of having wild boar involved in society.
12. **SU’ESU’EGA (Assessment Task):** The teacher will assign to the students a simple task of acting out a pig and then the teacher will assess each students of what they think pigs do.

13. **VA’AIGA LAUTELE (Overview)/FA’AILOA LE ILOA (Prior Knowledge):** The teacher will involve the students in a small discussion on what they already know about pigs and what kind of pigs they know are in the place they live.

14. **FA’ASOLOGA O A’OA’OGA (Instructional Procedures)**
   
   c. **GAIO’IGA TATA’I** (Focusing Event): The teacher and the class will act out specific yet simple characteristics of wild boar and list the good characteristics as well as the bad characteristics.
   
   e. **FA’ATA’ITA’IKA FA’ITOGA** (Teacher Model): The teacher will write the word “wild” on the board and act wild and then list wild as one of the negative or con part pertaining to wild boars involvement in society.

   i. **FA’ATA’ITA’IKA/FA’ATINOGA FA’ATASI** (Guided Practice): The teacher will write a word (hungry) on the chalkboard and the teacher, along with the students, will act out hungry and list it as a positive or pro in involving wild boar in society.

   o. **FA’ATINOGA TA’ITO’ATASI** (Independent Practice): The teacher will write the word rude on the board, explain a little bit more what rude means to the students and have the students act out being rude. The teacher and the students will then identify “rude” as a negative to wild boars joining society.

   FA’AI’UGA: The teacher will present a brief and simple video of a wild boar, educating the students more on the positives and negatives of settling wild boars in human society.

15. **MEAFAITINO (Resources/Materials, References):** Chalkboard and video of wild boar.

16. **ILOILOGA (Evaluation):** The teacher will record down individual observations of what each student can do in regards to the lesson.

17. **TOE-MANATUNATU (Teacher Reflection):**

   O ā Vaega sa lelei/manaia/maua e tamaiti? (What worked?) The teacher, judging from his or her evaluation of the class, will figure out the parts of the lesson that attracted the students’ attention more and worked according to the teacher’s intentions.

   There is an extension to the lesson where parents can see and understand what the students are learning within the classroom and take it outside of the classroom. The parents can then spend time with their children outside of the classroom observing the behaviors and characteristics of domestic animals, due to the fact that our daily domestic life is wild boar-free.
The parents notice and teach their children more things that might or might not have been covered by the teacher.

O le ā se mea na lē lelei ona fa’atino? (What didn’t work?) The teacher will observe and record the parts of the lesson that did not go through with the students.

E fa’apefea ona toe fa’alelia/suia mo le aga’i i luma? (How would you improve this lesson?) In recording the things that did not work, the teacher can refer back to it, make another approach at the same things and then teach it for another time.

5. GALUEGA E ’AVE I LE FALE (Homework): The teacher will give notes to the parents, asking them to further educate their child in the ways of wild boar and pigs, in general. This allows the students to get more involved in nature outside of school.
Common Name: Bearded Pig  
Scientific name: *Sus barbatus*  
Samoan name: Pua'a Faiava  
Other names: Sanglier a moustache, Bartschwein, Nangoi, Babi putih  
Kingdom: *Animalia*  
Phylum: *Chordata*  
Class: *Mammalia*  
Order: *Cetartiodactyla*  
Suborder: *Suiformes*  
Family: *Suidae*  
Tribe: *Suini*  
Genus: *Sus*  

**The Bearded Pig has never been introduced to the Polynesians...until NOW!**

Geography: Use Google Earth to show students where bearded pigs are found and how far it is from American Samoa, specifically, their teacher Pauline Silao’s classroom.
Three interesting facts from a Science Point of View:

1. It can crossbreed with the Domestic Pig
2. It has the largest head of all pigs
3. They get their name from the abundant whiskers on their nose and small facial warts

In Southeast Asia, just like in Samoa the bearded pig is hunted for its meat. It is not dangerous.

**LESSON TITLE: THREE LITTLE BEARDED PIGS**

Subject: Science  
Grade Level: ECE  
Time Span: 90 min  
Objective: Using the story “Three Little Pigs” students will be able to explain what kind of materials are good to use to build with and what materials are not good to build with.

The Three Little Pigs  
Once upon a time there was a mother pig who had three little pigs. The three little pigs grew so big that their mother said to them, "You are too big to live here any longer. You must go and build houses for yourselves. But take care that the wolf does not catch you."

Assessment Tasks:

Overview/ Prior Knowledge:  
Teacher will show a short video of the story of the three little pigs. Before showing the video-remind students to pay very close attention to what the pigs used to build their homes.
Instructional Procedures

a. Focusing Event: Teacher will pass out a brick, let the students touch/smell/see what a brick is like. Teacher will write word 'brick' on wall. Teacher will pass out sticks, lets students touch/smell/see what the sticks is like. Teacher will pass out a straws/ or hay, let students feel/smell/see what hay is like. Teacher will write both words 'hay' and 'sticks' on wall.

b. Teacher Model: Teacher will show students different 'materials' to build with. Teacher will display her own model of a house she built – and blow dry (bad wolf) to see if the house model will withstand the strong winds of the blow dryer.

d. Guided Practice: Teacher will have students in pairs. Students will pick items to build one house. Students will start building and teacher will supervise.

d. Independent Practice: Students will share what they build and why they used the certain materials used to build their house.

Closure: Compare and contrast the different homes the students built. Which ones got blown down by the big bad wolf? Which ones did not? Why?

Materials: straws, brick, sticks, (basically anything creative to have students build homes with) and binding material like tape, glue, ribbon, glue gun, glue sticks (if you want to help students use hot glue).
Name: Samoan Pua’a, English Pig, Domestic Pig

Scientific Classification
Kingdom – Animalia
Phylum – Chordata
Class – Mammalia
Order – Artiodactyla
Family – Suidae
Genus – Sus
Scientific Name – Sus scrofa scrofa

Information about domestic pigs
Type – Mammal (warm-blooded)
Diet – omnivore
Size – 50-120 cm (19.7-47 in)
Weight – 30-350kg (66-770lbs)
Top speed – 17km/h (11mph)
Life span – 8-15 years
LifeStyle – Herd
Conservation status – Least concern
Colors – Grey, pink, black, brown, white
Skin Type – Hair
Favorite Foods – Roots, seeds, leaves
Habitat – Forest and grassland
Average Litter Size – 7
Predators – Humans, wolves, snakes
Special Features – Curly tail and upturned snout

http://a-z-animals.com/animals/pig/

Family History: Domestic pigs were introduced to Samoa from Asia and Europe

Story from my uncle Soa Taiao, age 70 from Upolu: Village of Samusu
Once upon a time, there was a couple who lived in a small village in Upolu. The man’s name was Va’a and the lady’s name was Sina. They had four children and they were so poor. But Sina and Va’a had a pig pen, and inside the pig pen there were four big pigs, five size 2 pigs, and five size 3 pigs, and all the pigs have short mouths. The pigs were colored white, brown, and black. Sina and Va’a relied on their pigs for their children’s education. Sometimes Va’a killed the pig and took it to the factory to sell for money to pay for their children’s education and buy their children’s uniforms. And sometimes when Va’a cooked a size 2 pig, he always distributed and shared it with their neighbors. Va’a saved the pig (head) ulu for him, the o’o or the (back) went to chief of the second grade on the other side of their house, the (shoulder) alagalima went to the talking chief their other next door neighbor, the (loins) tuala went to the Priest of the Catholic church, and the rest was for the family. Va’a and Sina’s children were well educated with the money from the pigs; the pigs were so useful. The children found good jobs and their work changed the way people described the family. They went from being poor to the opposite-- they became the richest family in the village. They owned a hotel, cars, and also owned a fast food restaurant. Their pigs are the best support for their fast food restaurant. They even hired workers to take care of the pigs. Now Va’a and Sina live in a big happy family

Resource: Cultural uses past and present: Pigs can be a family’s financial and cultural resource. They are important in marriage ceremonies. In Western Samoa there is a factory that buys pigs and the money can pay children’s school fees. We use pigs for gift, and a pig is usually mentioned first in a peace settlement. We also use pigs for funerals for the food or a gift to the Pastor who prepares the service.

Technology, Engineering: Pig sty or pigpen: The different styles of pigpen.

Precaution anything dangerous: http://www.epa.as.gov/piggery-compliance
1. The objective of the AS-EPA Piggery compliance program is to protect human health and the environment by enforcing compliance for piggeries to meet the objective of controlling pig wastes that pollute streams and ground water. The branch regulates and enforces compliance through a concerted program of educational outreach, inspection warning, citation, and follow up. Implementation of the program will result in direct improvement to surface water quality, and subsequently reduce the incidence of leptospirosis and other diseases. A collateral benefit will be improved quality of life in crowded village.

2. Eating too much can lead to the main health problems in American Samoa: being overweight (obesity) and having high blood pressure.

Lesson Title: Pua’a

Mataupu (subject): Science
Vasega Amata (Grade): ECE AGE 3&4
Time Span: First section morning section.

Goals of the lesson:
1. Students will be able to identify the different parts of the pig.
2. Students will be able to identify the use of pig in the Samoan Culture.
3. Students will be able to identify the size, the color and the family or cousin.

1. MATATIA MA ALAFUA (ASDOE CONTENT STANDARD) (S):
2. Matatia (Strand): PKSB - characteristics of organisms.
3. Alafua (Standard): PKSB - The student will demonstrate and understanding of similarities and differences among living and nonliving things.
4. Benchmark (La’asaga): PKSB – Recognize the similarities and different in tree and animal color size appearance etc.
5. Sini fa’amoemoeina/Taunu’uga Autu (Objectives):
   - Student will be able to identify the different parts of the domestic pig.
   - Student will be able to identify the use of pig in our culture.
   - Student will be able to identify the size, color, family and cousins.

3. Suesuega (Assessment Task):

4. Va’aigalautele (Overview)/ Fa’aiola le iloa (Prior Knowledge): Ask open open-ended questions:
   - Why do we need to learn the different parts of the domestic pig?
   - What are the uses of domestic pig in our culture?
   - Why is the distribution of the cooked pig so important to our culture?

FA’ASOLOGA O AOAOGA (Instructional Procedures)
A. Gaioiga TATA’I (Focusing Event): Teacher shows the picture of a Samoan distribution of a pig.
   On a chart put numbers from 1-10 on each part.
   1. Ulu – (head) to the aumaga, young men who cook the pig.
   2. Ivi muliulu – (neck) to the tulafale, talking chief
   3. O’o – (back) to the Alii, or the chief of second grade
   4. Alagalima – (shoulder) to the tulafale, talking chief
   5. Tuala – (loins) to Alii of the first grade
   6. Itu mea tele – (big side) to the Alii of second grade
   7. Itu pale asu – to the family of the chief
   8. Muli--to the women
   9. Alagavae – (leg) to the matai chief of lesser rank
   10. Alo – (abdominal) wall to the taupou, village sacred maid.

B. FA’ATAITAI FAIAOGA (Teacher model): (I DO) Cut out all the pictures of Samoan distribution of a domestic cooked pig from number 1 head to number 10 abdominal
   (SHOW AND TELL) Teacher makes sure to show the children each part of the cooked pig picture and tells the student what number is next to it.

C. FA’ATAITAIGA/ FA’ATINOGA FA’ATASI (GUIDED PRACTIC): (WE DO) We are going to put those cut out picture together as a puzzle with the help of the chart and by following the numbers.
D. FA’ATINOGA TAITOATASI (INDEPENDENT PRACTICE): (YOU DO) Have all the cut out pictures of the distribution of the cooked pig on the floor with each piece numbered 1-10. Go around the circle inviting each child to come and pick a picture with the number on it and match with the chart of the whole pig.

1. MEFAITINO (RESOURCES/MATERIALS,REFERENCES):
Fesaaoni mo le Faia'oga

"E tata'a manu o le vao a ua uma ona fa'asoa." O se tasi lenei alaga masani a tulafale i a latou feta'alaiga. O Iona uiga, o manu o le vao, po o fo'i o le sami, ua uma ona tu'ufa'asaga vaega ta'itasi ma le tagata ua tata'a i ai. Ua iloga vaega po o tufa'aga mo ali'i, tulafale, tama'ita'i po o aumaga fo'i. Ina ua o'o mai le talailei, na fa'aopoopo i ai ma se tasi inati, o feagaiga ia a le nu'u. E tulaga tutusa i latou ma fa'aao o nu'u po o aalafaga.

O le fa'asoaina o Taumafa ese'ese:

a. O le Pua'a: (managata po omea i tua'olo)

1. ulu aumaga
2. ivimuliulu tulafale
3. o'o ali'i tulaga lua
4. alaga lima tulafale
5. tua'a ali'i sili/faite'aau
6. itumeatele ali'i tulaga lua
7. muli, nofoi tama'ita'i
8. alagavae ali'i tulaga maualalo po o tulafale
9. ofu o le fa'afaleolo ali'i

10. o
THE PLANTS OF AMERICAN SAMOA

ARUM FAMILY (*ARACEAE*): Anthurium—Elena Logololo, Talo/Taro--Nofoafono
Suafa‘ase’e, Giant Taro/Ta’amu--Auga Aoelua

ANTHURIUM

ELENA LOGOLOGO

FAGASA ECE

Names:

a. **Samoan**: Lau Talo
b. **English**: Anthurium
c. **Scientific Name**: Anthurium
d. **Family**: Arum Araceae (Taro, Giant Taro)
e. **Genus species**: Anthurium

History:

- In 1889 the first anthurium was brought to Hawaii from London by S.M. Damon. After 100 years of cultivation and hybridization the Hawaii anthurium is considered Hawaii’s principal ornamental export.
- In 1959 Hawaii produced 2.6 million flowers
- By 1980 the anthurium production in Hawaii peaked at 2.5 million dozen flowers.
- Hawaii shipped anthuriums worldwide to Italy, West Germany, Switzerland, Australia, Japan, Taiwan, and the U.S mainland.

Story:

- With their open, heart-shaped flowers and tropical disposition, it’s no wonder that anthurium have come to symbolize hospitality.
- Also known as the Flamingo Flower, Boy Flower, Painted Tongue and Painter's Palette – because of their distinctive shape and color – the name anthurium comes from Greek, meaning "tail flower." Exotic and compelling, with bold, typically red flowers and shiny, dark green foliage, anthurium, like the hospitality they represent, are long lasting and irresistibly beautiful.

Uses:

- Use of anthurium in steam for the discomforts of arthritis and rheumatism. You cut up the leaves and boil it in a pot and have the person sit over it in a chair with a blanket. The person sweats and the medicinal properties enter the body through the open pores. It is
also useful as a poultice for muscle aches and cramps. You take the leaf and wrap it around your neck or your back and at the end of the day, just peel it off.

- **Cultural Connection:**
- An anthurium flower is mostly use for flower arrangements by most florists.
- People grow anthurium plants in garden or around their homes for landscaping.
- Commonly used as an ornamental plant in floral displays, or as house plants

**Precautions:**
- All parts of the plant is poisonous.
- If ingested, may cause mild stomach disorders.
- The anthurium plant's sap can cause skin irritation.

**LESONA (LESSON TITLE): ANTHURIUM PLANT**

**MATĀ’UPU (Subject):** Science

**VASEGA ‘AMATA (Grade):** ECE

**TIME SPAN:** 45 minutes daily and field trip (5 days)

**GOALS OF THE LESSON:**
- Students will gain understanding of the importance of plants. The will learn to appreciate other living things like plants and animals around them.

18. **MATĀTI’A MA ĀLĀFU (ASDOE CONTENT STANDARD(S)):**

- **MATĀTI’A (Strand):** Science
  - **ĀLĀFU (Standard):** Science
Benchmark (La’asaga):
- 24. Uses scientific inquiry skills
- 25. Demonstrates knowledge of the characteristics of living things.
- 27. Demonstrates knowledge of Earth’s environment
- 28. Uses tools and other technology to perform tasks

MATĀTI’A (Strand): Language Arts

ĀLĀFUA (Standard): Language Arts
Benchmark (La’asaga):
- 37. Demonstrates progress in listening to and understanding English
- 38. Demonstrate progress in speaking English

MATĀTI’A (Strand): Mathematics

ĀLĀFUA (Standard): Mathematics
Benchmark (La’asaga):
- 20. Uses number concepts and operations
  a. Counts
  c. Connects numerals with their quantities
- 21. Explores and describes spatial relationships
  a. Understands shapes
- 23. Demonstrates knowledge of patterns

SINI FA’AMOEOMOEINA/TANU’UGA AUTŪ (Objectives):
- Students will be able to identify the anthurium plants/flower and its parts
- Students will be able to name parts of the anthurium plant

SU’ESU’EGA (Assessment Task):
- Students will color picture of an anthurium plant individually. The will color the picture accordingly to the color listed for the parts of the anthurium.
  - Flower---red
  - Leaves—green
  - Stem—brown
  - Roots—black

Other Activities:
- Create Paper Anthurium Flower
- Anthurium Flower and Leaf Pattern Print
- Plant a garden of Anthurium in front of the classroom.
- Field trip

VA’AIGA LAUTELE (Overview)/FA’AILOA LE ILOA (Prior Knowledge):
- Teacher will ask these questions of students
- What is a flower?
- Name colors of a flower?
- Name a flower.
Teacher will write students’ responses on white board.

2. **FA’ASOLOGA O A’OA’OGA (Instructional Procedures)**

a. **GAIO’IGA TATA’I (Focusing Event):**
Teacher will ask questions to students, what is a flower? What color is a flower?
Teacher accepts students’ response.
Teacher pass out paper and crayons to students and tell students to draw a picture of a any flower they know.

b. **FA’ATA’ITA’IGA FAIĀ’OGA (Teacher Model): (I Do)**
Teacher will explain to students, today we will discuss a particular plant called “Anthurium.”
Teacher will show students the Anthurium powerpoint presentation. The Anthurium presentation includes anthurium flowers in different colors and in flower arrangements. Teacher will present a picture of a colored anthurium plant. Teacher tells students that anthurium flowers have different colors like red, white, purple, and pink; today the teachers flower is color red.

c. **FA’ATA’ITA’IGA/FA’ATINOFA’ATASI (Guided Practice): (We do)**
Teacher will have a picture of the anthurium plant on a big poster. Teacher will ask students to each pick any color crayon and lets all color our anthurium flower poster for our bulletin board.

d. **FA’ATINOGE TA’ITO’ATASI (Independent Practice): (You do)**
Teacher will give the students instruction; they will each choose a color for their anthurium plant. Teacher will pass the picture of anthurium flower for the students to color. Teacher will direct students not to color the outside of the picture. Try to color the inside of the picture. After coloring their picture, they will present their picture.
*(Students will present their picture; name the color, and why they use that color.)*

e. **FA’AI’UGA (Closure)**
What was the lesson of the day?
What flower/plant did we discuss?
What colors of the anthurium flower?
Display of students work samples.

3. **MEAFAITINO (Resources/Materials, References):**
- Anthurium plants
- Anthurium pictures
- Anthurium coloring worksheets
- Anthurium plant parts worksheets
- Laptop
- Projector
- Crayons
- Markers
ANTHURIUM WORKSHEETS

1. Anthurium Plant Parts/ Vaega o le Laau Lau Talo
Anthurium Flower Coloring Worksheet
1. **Names**: Talo

   *Family name*: *Araceae*
   *Scientific name*: *Colocasia esculenta*
   *Kingdom*: *Plantae*
Order: **Alismatales**  
Species: *C. esculenta*  
Introduced by: Polynesian Introduction  
Origin: India

2. **Family history:**

**Taufusi Plantation in Aunu’u**

Taro is grown on all islands in the Territory, mainly by the “dry land” method. “Wetland” taro is grown on Aunu’u and the outer island of Ofu, Olosega and Ta’u, the taro fields are not flooded, however, as in other countries. Taro is a member of the plant family *Araceae*, which includes anthurium, philodendron, caladium and potos. There are three taros that are commonly grown in American Samoan. *Alocasia* (giant taro), *Xanthosoma* (talo palagi) and *Colocasia* (talo,kalo). The latter is the favored eating taro. The taro plant is a collection of long-stemmed, heart-shaped leaves growing from a swollen underground stem, or corm. Leaf stems, or petioles, emerge from the top of the corm at ground level and vary in length from 1-5 feet. The corm is a nutrient storage organ similar in function to the yam or potato. It is eaten baked in a traditional rock oven (umu) or boiled. Taro reproduces by forming either cormels (suckers) or stolons (runners), both called lauvai in Samoan. The inflorescence, flower is a spadix of closely packed, small, male and female flowers surrounded by a yellowish-green spathe. Dry land taro is not irrigated in American Samoa and wetland taro is not flooded. The taro fields of Aunu’u Island, for example, were once below the high water table but years of accumulated vegetation have created a deep, spongy mat into which tiapula are planted. Deep trenches around and through the fields keep them from flooding. The resulting taro is prized by the Samoans for its taste and texture.
3. Story:

In the past, Samoa did not use written words, only oral language. Most of the family history was told to the next generation through oral communication. These are the kinds of stories that I heard from my father, only oral but no written stories. This tradition led to the strong cultural value of storytelling, that’s how they kept the past alive.

A long time ago, there was a couple that lived in Heaven named Tagaloalagi and Uluifuga. So Amuamuia and Finatele sent their son Vaea’i up to heaven to ask Tagaloalagi for some water and also the authority to govern the country. When the boy arrived in Heaven Uluifuga asked him why he had come, and what is his business. The boy explained the reason of his visit. So Uluifuga told him to remain quiet and not to speak to Tagaloalagi when he returned from his plantation. Tagaloalagi returned and asked the reason of the boy’s presence. Uluifuga explained that the boy had come on his parent’s business and Tagaloalagi asked what the business was and Uluifuga said that the parents of the boy wanted some taro heads to plant on earth. Tagaloalagi told the boy to return to earth and he would send some taro heads by his own boys later on. So Vaea’i return to earth. Tagaloalagi remarked to his wife that he doubted that the boy had come for taro heads and believed that he had come to get the authority to rule on earth. Uluifaga then asked and Tagaloalagi would do as he was asked and Tagaloalagi promised that he would. He ordered some of his sons to bring some taro heads and to conceal them between their legs. Tagaloalagi said he was in great fear that what he was about to do would become known by other members of his family. He explained to the boys that Tagaloatea would proceed first to earth and he would be followed by Moefano and Imoa. He asked them to be strong and first lower the water. This was done. This was the beginning of Vaitu’utu’u. The authority to govern the earth was later taken to the people who asked for it.

4. Culture:

Samoa culture is a very rich one with distinctive traditions, cuisines, dance, dress, patterns and also various forms of handicrafts. The main aspect of Samoa culture may be said to be the togetherness that is the key in every family in Samoa. Samoan people have their own dance style that is accompanied with traditional music. The dresses are the other part of the culture. Samoa
culture is very rich with a number of distinctive features. In the heart of the Samoa culture there lie the respect and obligation for togetherness and family. Samoa culture can be said to be woven round large groups of families. However, at present, Samoa culture also bears the sign of being influenced by other cultures outside the island. Samoan festivals are of many types. There are festivals in Samoa that are traditional and cultural and again, many festivals are related to these religious observations. The most popular of a number of Samoa festivals is the fire knife festival. This is a traditional festival that is becoming popular worldwide. With a number of other festivals, Samoa life in general is very colorful.

The Samoan people used to worship birds, stones, the sea, and rivers as their gods and goddesses. But with the arrival of Christianity, people came in contact with a new world and religious faith. In the original religion of Samoa, a kind of Pagan religion, the Samoan people used to worship various forms of nature as their gods. But this form of religion had a limited scope and as soon as Christianity arrived in Samoa, most of the Samoan people converted in this new form of religion. In fact, Christianity is the religion that brought Samoa into the connection with the outer world.

5. Precautions:

* Whenever you work with a taro be sure to wear gloves, or oil your hands and arms, as it contains calcium oxalate crystals which can irritate your skin. Taro root and leaves are inedible raw, they need to be cooked effectively otherwise they could have side effects on the health, and they are poisonous whenever raw.
* The other precaution for the health of taro is seen in their leaves. Taro leaf blight is the most devastating disease for taro in Samoa. Using disease-free planting material, physical removal of diseased leaf portions, and even intercropping are some of the sanitation and cultural practices being employed to cope with the disease. So far, neither taro beetle nor the alomae/bobone virus disease are of any economic importance in Samoa, and are probably absent from the country. This disease was reported in American Samoa in 1993; it was reported to Samoa just few months later.
Weeds are the other problem in taro production. Weed species affect agriculture throughout the Pacific Islands. One of the most important weeds affecting taro production is purple nutsedge, *Cyprus rotundus*.

Armyworm. Many American Samoa farmers list armyworm (*Spodotera litura*) as the main taro insect pest. As you can see the picture at the bottom, the armyworm larvae feed on the surface of a taro leaf.

**Left and Right: Armyworms feed on taro leaves.**

**Above: Infection with whitish spores and oranges exudate.**

**LESSON TITLE: SAMOAN TARO**

**Subject: Science & Math**

**Grade Level: ECE**

**Time Span:** According to the ECE schedule, each child should complete three and half-hours in the classroom, four days a week meaning, Monday-Thursday, actually we can take the students to a field trip on Thursday for the completion of the lesson. But Friday, we clean our classroom and prepare it for the next week changing the environment inside the classroom.
GOALS OF THE LESSON: The teacher has to prepare things for her lesson, for example, the teacher should bring a taro to class to show students what the lesson is about, and prepare activities based on the lesson. The teacher has to elaborate or explain the usefulness of taro and the importance of taro, so by the end of the lesson, they will know its usefulness and importance, the letter that starts the name taro, and the spelling of the word taro. They should know the shape and the colors of the taro and all the parts of the taro.

STANDARD: SCIENCE & MATH & LITERACY

BENCHMARK: Science, Math and Literacy

- Demonstrates knowledge of the characteristics of living things.
- Demonstrate knowledge of the physical properties of objects and materials.
- Demonstrate an understanding of quantities.
- Compares and measures.

OBJECTIVE:

Students will be able to name the plant, (taro) identify parts of the plant, count how many leaves on the plants, use their five senses, know the letter that starts the name taro.

ASSESSMENT TASKS:

- The teacher will use observation during activity, as well as at the tables with individual activities, to assess if they have gained their knowledge if they can count 3 or 4.
- Group the students: one will count how many leaves are on the plant, the other group will identify the colors of the plant and the shape of the taro plant.

OVERVIEW / PRIOR KNOWLEDGE:

This lesson plan is based on ECE students or preschool students, and it has been observed that the students are able to count, identify, and use their five senses.

INSTRUCTIONAL PROCEDURES:

- Teacher will use a Power Point on Hawaiian Taro for the understanding of the children
- Place one taro leaf on the table #1 and count how many taros are on the table #2.
- Ask the students how many taros are on table #2.
- How many leaves are on table #1.

(a) Focusing Event:
* Teacher will provide real taro that has all its parts.
* Teacher will ask the name of the plant, how many leaves, colors of the leaves, and where do they get the taro.

(b) Teacher Modeling:
* Teacher will show the sample of taro or plant.
* Teacher will say the name of the plant.
* Teacher will put up the chart of the taro.

(c) Guided Practice:
The teacher divides the class into groups of five, and they will create their own taro plant. Teacher will supervise and give guidance if needed.

(d) Independent Practice:
* Teacher will divide students into groups of four with four students in each group.
* Teacher will give each group a taro plant.
* Each group will use the picture of the taro to name each part of the taro.
* Teacher will walk around and ask questions about their work.

CLOSURE:
After completing the task, teacher will give each group a chance to showcase their chart and name each part of the taro plant.
- Can you name the colors of the taro?
- How many leaves of the taro.
- Where do you get the taro?
- What is the importance of taro?

MATERIALS: Tag boards, construction papers, crayons, and taro plant, power point

RESOURCE: ECE Assessment / Objectives for Development and Learning /

REFERENCES:
Aleki Sosone Feagai (Samoan story)
www.everyculture.com>…?Tajikistan to Zimbabwe
GIANT TARO, TA’AMU
AUGA AOELUA
PAGO PAGO E.C.E

GIANT TARO

Samoan name: Ta’amu
English name: Elephant ears, wild taro, false taro
Family name: Araceae
Scientific name: Alocasia macrorrhiza
Kingdom: Plantae
Genus: Alocasia
Species: A. macrorrhizos
Binomial name: Alocasia macrorrhizos

Family History: Alocasia macrorrhiza is a member of the Araceae family. It is a tall succulent herbaceous plant that can reach up to 4.5m. It has a large elongated stem. The leaves are huge about 0.9m long and generally arrow shaped, with shallow and rounded lobes. The leaves point upward forming straight line with the main axis of the petiole. They have a conspicuous mid-rib and are green in color. The spate has glucose, yellowish-green blade. The ovules are one to a few in each ovary cell in sub basal placenta. It is native to rainforests from Malaysia to Queensland and has long been cultivated on many Pacific Islands and elsewhere in the tropics. Common names include Giant Taro and Elephant Ear Taro.

Interesting things from a science point of view: Finding a Giant Taro is far more fun than growing one. It takes 18 to 24 months to develop a large root (actually a rhizome). However, Giant Taro can be harvested nearly any time in the growth cycle, though a large mature root will feed an entire family. It propagates by offsets or by cutting up the root. If you are cultivating the species it can be quite demanding requiring rich soil, constant moisture and feeding three times a month. Should you decide to grow one know the root is planted vertically, not horizontally. It can be grown in Northern climes but needs to be overwintered inside. And on the plus side is that
it is a root crop that will grow in significant shade. The roots have a potato-like flavor and the white interior of the thick stems can also be eaten.

After boiling the cooked stem material is dried then ground into flour. As with most plants in this family the Giant Taro has calcium oxalates, which are needle-shaped crystals. They give an affect of burning if you handle them improperly and can make you ill if you manage to consume them. Cooking breaks down the calcium oxalate making the root and stem material edible. The most common means of preparation is boiling and cutting up parts of the root.

Fermented rice in Giant Taro leaves.
Amorphophallus paeoniifolius (below) is perhaps one of the ugliest flowers (inflorescence) in the world and to accompany it, it has one of the worst scents that you can imagine. It’s hard to get close to the flower when it’s releasing its perfume. Fortunately, the foul odor only lasts for a few hours after the flower opens. The plant only blooms when mature and even so it doesn’t bloom every year. Flowers last only about 5 days. Even more interesting, during this phase the plant generates heat which can be felt if you have the guts to stick your hand inside the inflorescence. The heat and the smell mimics an animal that has recently died to attract the flies that will pollinate the flower.

**Story:** This is about an old lady name Gaotala and her husband name Leatini they had a son name Tupou who had a sickness or a disease that no one had a cure or a medicine for his sickness. So one day Gaotala went to the market to buy a ripe bananas for her son, and she heard a group of ladies talking about an old man from western Samoa who arrived here on Monday that had medicine for any kind of sickness. So Gaotala hurried back home to tell her husband Leatini and her son Tupou about the good news she heard. Leatini stood up and walk right out the door to ask around their village people if anyone knew about this old man, what’s his name, where he lives. Finally he found his information about this old man. So they took their son Tupou to the old man to ask him to tell them what medicine could be a cure for their son’s sickness. They explained the son’s sickness to the old man and just by listening, the old man told Leatini, “Go and look for a giant taro, then use the leaf steam and root used for joint pain, treatment of injuries, and earache.” So Leatini and Gaotala took their son back home and did what the old man told them. So the very next day, Tupou felt much better than before, his parents were very happy to see their son standing on his two feet again. So Gaotala and Leatini
went back to the old man’s house and thanked him for telling them the medicine to use for their son’s sickness. After that, Tupou grew giant taro in the back yard of their house.

**Samoan story:**
O le tala i se ulugali‘I o le lo’omatua e igoa ia Na’otala ma lona to’alua e igoa ia Leatini, e iai le la tama e igoa ia Tupou. O le tama lea o Tupou, e iai le ma’i e maua a o ia, e le mafai ona tu i luga e tiga ona va’e, ua uma ona ave e fofo ae leai lava se suiga ole ma’i. Sa popole lava le ulugali‘i’i i le la tama. Sa o’o loa i le taeao e sos’o ai, sa alu loa le lo’omatua i le maketi e fa’atau mai se fa’ipala a lana tama o Tupou. Sa fa’ałogo atu Gaotala o lo’o ta’ua mai i talanoaga a nisi o tina e fa’aapea, o anapo sa taunu’u mai se toeaina mai i Samoa Sisifo e lelei lana foma’i; vave loa le savali a le lo’omatua e fa’atali lana pasi e alu ai i le fale. Taunu’u loa le lo’omatua i le fale ma fa’amatalo loa i lona to’alua le tala sa fa’ałogo i ai, tu loa Leatini i luga ma savali i fafo o le fale e su’esu’e i tagata ole nu’u pe iloa e latou lea toeaina, a o ai foi lona igoa ma le mea e nofo ai. Ua iloa nei e Leatini le tala e uiga i le toeaina ona alu loa le i le fale ma talanoa i lona toa’lua o Na’otala, sa ave loa Tupou va’a ai le toeaina lea. Sa fa’amatala loa e le lo’omatua ma ma’i o si ana tama. Fai mai loa le toeaina alu e ao mai le lau ta’amu. e saka le lau ma le a’a ia pupuna lelei, a vela ona inu lea o le suvai, a uma ona fa’amalili lea ole suvai, ona mili ai lea vaega o le tino o lo’o tiga po’o afaina. Sa te’i le lo’omatua o Na’otala ma le toeaina o Leatini ona ua va’ai atu ua mafai ona tu ma savali si a la tama o Tupou, ma ua va’afia ai foliga fiafa o le toeaina ma le lo’omatua i le suiga ua o’o iai le la tama ma ua malosi. Sa o loa Na’otala ma Leatini e ave le faafetai i le toeaina e tusa ai ma le fesoosoani i le la tama o Tupou.

**Culture:** Here in Samoa for the past and present we still use the giant taro to help cover the Samoa oven and use it for medicine to help out with injury of your body, However it will depend on local policies and the attitudes of the islanders towards cultural change. In our cultural we still have Samoan people worked on their plantation for a living, and that’s to sell giant taro at the market. In the future I know it will be less selling taro at the market, people will stop growing and working at their plantation but depend on buying from the stores.

**Precaution:** Giant taro will give you an affect of burning if you handle them improperly and can make you ill if you manage to consume them, and it can make you itchy if you hold the leaves to yourself and handling plants may cause skin irritation or allergic. If it’s not well cooked it will cause reactions in your mouth and be itchy at the same time.

**GIANT TARO, TA’AMU LESSON**

**Grade:** E.C.E.

**TIME SPAN:** 3½ hours in the classroom.

Students should spend 3½ hours in the classroom; each student must meet the time in every classroom.

**Goals of the lesson:** Students should identify and naming each parts of the giant taro.
Strand: Science, math and literacy

Benchmark: Identifies and names letters, Understands shapes, Uses tools and other technology to perform tasks

Objectives: Students will be able to point out to each parts of the plants and name them, counting how many leaf of the giant taro, and also know the first letter of the name giant taro.

Assessment Task: how would you assess you students in the classroom? Give work to the students, teacher is involved in the activities, observes students during their work. Teacher notes students’ communication during circle time and during questions.

Overview: Students will be able to name and point out to parts of the giant taro. Students will identify or matching the first letter of the giant plant. Students will be able to place the numbers on the leaf of the giant taro and tell how many leaves.

Instructional Procedures: table number 1 put 2 leaves, table number 2 put a giant taro plant, asks questions, table number 1 how many leaves on that table? Table number 2 how many giant taro on that table?

(a) Focusing event: Teacher will provide the giant taro plant. Teacher will ask what’s the name for the plant? What color? how many leafs? Where would you find it?

(b) Teacher Model: Teacher will show students the giant taro plant, and point out to every part of the plant, show students of how to plant a giant taro.

(c) Guided Practice: Teacher will have two groups of students and one group will draw the leaves and the second group will draw the stem but the teacher must always guide the students during their work.

(d) Independent Practice: Teacher will have students in 3 groups, each groups, will have different activities, first group will work on a puzzle putting together pieces of a leaf of the taro. Second group will name each part of the plant, and the third group will grow the plant in the dirt.

Closure: Towards the end of the day, teacher will have students in a circle and talk about what they have learned for the day. Teacher will ask questions about the topic giant taro and also about their work they have done for the day.

Resources: E.C.E assessment/ objectives development and learning/ Gaotala ma Letini,

BANANA FAMILY (*MUSACEAE*): FA’I, Adelle Talaeai

Names: Samoan, English, Scientific Family, Genus species

Kingdom: *Plantae*  
Domain: *Zingiberales*  
Family: *Musaceae* (banana family)

**Genus species**  
*Musa acuminata* (AAA Group)  
*Fa’i palagi*  
*Cavendish*  
*Musa x paradisiaca* (AAB Group)  
*Fa’i samoa*  
*Samoan banana*  
*Musa acuminata* (AA Group)  
*Fa’i misiluki*  
*Lady finger*  
*Musa x paradisiaca* (ABB Group)  
*Fa’i pata*  
*Bluggoe*

**Family history**: Native or introduced by Polynesians or others.

**Interesting things from a science point of view**: The banana is said to have originated from Southeast Asia. Earliest known cultivation of bananas began in New Guinea over five thousand years ago. Bananas arrived in the South Pacific on the canoes of seafarers travelling east from the Asia Pacific region.

The banana family contains many hybrids or crosses of banana species. Some hybrids are natural occurring where as the banana species cross and produce a hybrid banana. Wild bananas contain large seeds. They are difficult to eat. The edible and commonly cultivated bananas in Samoa are hybrids, with smaller seeds that are visible to the naked eye. The seeds are sterile.
Bananas are identical clones of each other. As a result they are easily prone to diseases. A certain disease can wipe an entire species of banana. For example the Gros Michel, which was considered the prized banana export of South America in the early 1900s, met its impending doom with the unfortunate help of a fungus. To avoid such catastrophes hybridizing or crossing banana species enables continuation of the banana. The Cavendish banana, which has replaced the Gros Michel in markets today, is named after an English duke. John Williams, an English missionary, introduced the fa‘i palagi, Cavendish banana, to the Samoan islands.

**Story:** traditional or from an interview with an elder or expert.

There was a couple that lived with an elderly blind man. One day the couple set out to make food for the elder. In front of the man, the couple laid out three different but almost similar dishes, banana smoothie (poi fa‘i), banana baked in umu (umu fa‘i) and banana soup (sua fa‘i). The old man smiled and gratefully said ‘You have both prepared so much food today with only one banana.’ There is an old Samoan saying that signifies the many uses of the fa‘i (banana) “E le iloa se mau i ni talo, a’o fa‘i.” This practically means, ‘There is more that can be done with bananas than taro.’

![Image of old Samoan saying]


**Samoan Folk song**

Mīnoi, Mīnoi, Mīnoi, Move, move, move
Mīnoi pei o se loi. Move like an ant
‘A sivasiva 'ua gāoioi. Once you’re dancing there’ll be some aches
Lololo fa‘ape‘epe‘e ‘ua loiloioi, Dipping in a rich coconut cream
Suiti, suamalie pei ‘o se poi. Sweet, satisfying like a banana smoothie.

*English lyrics by Aiava R. Talaeai.*
Cultural uses past, present, future potential:

- **Cultural connection:**
  - **Food**
    - *sua fa’i/banana soup* – ripe bananas mashed (fa’i palagi/Cavendish bananas used)
    - *poi fa’i / banana smoothie* – ripe bananas mashed mixed with coconut milk and lime leaves.
    - *saka fa’i* – boiled bananas with/out skin
    - *fa’alifu fa’i* – boiled bananas cooked in coconut milk
    - *umu fa’i* – bananas baked in umu
    - *tunu fa’i* – charred banana
    - *loi fa’i / banana dipped in c.milk* – ripe bananas quartered and mixed in coconut milk wrapped in banana leaves and baked in the umu (fa’i paka/bluggoe banana is preferably used)
    - *Pe’pe’e fa’i* – ripe bananas baked or boiled with coconut milk used as a dip
    - *Alolo, oololo, olo fa’i* - 70% ripe bananas and 30% green banana grated and mixed with coconut milk then wrapped in banana leaves and baked in the umu (fa’i paka/bluggoe banana is preferably used)
    - *Fa’avevela* – Samoans method of ripening multiple bananas in a ground pit for a week.
  - **Parts of Banana Tree and Uses**
    - *Aufa’i* – Bunch of bananas (cooking and eating)
    - *Laufa’i* – Green leaves (wrapping foods, eat on, used as decoration for dance)
    - *Lausului* – Brown/dried leaves (used as ula/lei decoration for dance)
    - *Ogafa’i* – Trunk/stem
    - *Pafa’i* – sections or chopped stem (*used as taulago/foundation-support for an umu*)
    - *Tumoa* – banana pod
    - *Togafa’i* – banana plantation
    - *Pa’ufa’i* – banana peel/skin
    - *Fa’i pula/Fa’i pala* – ripe banana

- **Social studies connection:**
  - Ss can research where bananas grow
  - Ss can research the history of bananas in a country
  - Ss can also research the origin of the ‘banana republic’ as well as the mass production and distribution of bananas or in short, the banana industry.
  - Ss can research how the banana shaped countries
  - Ss can use Google Map to plot coordinates of their country and share how locals use the bananas.

- **Art connection:**
  - Ss can create clay models of bananas or use dried banana leaves to create a model of a banana tree.

- **Technology and Engineering**
Bananas bruise easily. Ss should create a type of technology that removes the banana from the tree and prepares for packaging or for consumption.

- Banana trees become top heavy when they begin to fruit. Ss must construct a simple tool to keep bananas from tipping over.
- Ss can test the fiber of the dried banana leaves to test for strength and durability.

**Business connection:**
- Ss research the banana industry and the historical facts of the fate of the Gros Michel on bankrupting large fruit companies.
- Ss research the economic of growing variety of bananas or a single type of banana.

**Precautions:** anything dangerous? No.

**LESONA (LESSON TITLE): BANANAS OF AMERICAN SAMOA**

**MATÅ’UPU (Subject): Science – Science**

**VASEGA ‘AMATA (Grade): 10**

**TIME SPAN: includes field trip – 2 days**

**GOALS OF THE LESSON:**

**MATÅTI’A MA ĀLÅFU (ASDOE CONTENT STANDARD(S)):**
- MATÅTI’A (Strand): Life Science
- Benchmark (La’asaga): BIO2.9.2: Connect the principles of taxonomy to the existence of genetic variation in species

**SINI FA’AMOEMOEINA/TANU’UGA AUTÛ (Objectives):**
- SWBAT (Students will be able to)
  - Explain the importance of taxonomy by using characteristics to identify and classify organisms
  - Identify and characterize banana varieties found in American Samoa.
  - Connect the significance of banana varieties in enabling the continuation of cultural heritage.

**SU’ESU’EGA (Assessment Task):**
- Identify the genus and species name of the banana plants provided. The teacher can mix up the names and have the student write the name in correct order. The teacher can also provide hints for students by providing the genus name of a certain type of banana. To make things challenging.

**VA’AIGA LAUTELE (Overview)/FA’AILOA LE ILOA (Prior Knowledge):**
K-W-L pre-assess students on their knowledge of bananas and it’s cultural influence.  
*What I know, what I want to know and what I’ve learned.*

**FA’ASOLOGA O A’OA’OGA (Instructional Procedures)**

e. **GAIO’IGA TATA’I (Focusing Event):**
   - Play ‘Minoi’ video clip by Laughing Samoans or choir.
   - Teacher (T) displays Samoan and English lyrics for students to sing along.
   - T passes out K-W-L worksheets for students (Ss) to fill out.
   - T asks the Ss to call out the types of bananas they are familiar with and to name a few uses of bananas in Samoan culture.
   - T lists student answers of bananas and its uses in Samoan culture.
   - T lays out four variety of bananas commonly used in American Samoa: fa’i palagi/Cavendish, fa’i paka/bluggoe, misiluki/lady finger and fa’i samoa/samoan banana.
   - T asks the class what the Tahitian or Hawaiian name is for each banana on display.  
     *(Chances are the students would not have a clue)*
   - T explains that the name ‘banana’ is used to describe a certain banana but if you were to ask a Tongan or Fijian for a fa’i they would not know because the name is only used in Samoa. The same can be said if a Hawaiian were to ask a Samoan for a their version of banana. Each culture and language has it’s own common name for banana. Because there are many types of bananas some bananas have two to three names to identify them. For example the fa’i paka (bluggoe) is slightly different from the fa’i paka sina (silver bluggoe) based on the color of the banana. Although they are almost identical in shape, the fa’i paka sina is a bit more hollow and lighter than the fa’i paka. The purpose of using two names is not new. Even though Samoans have their own versions of bananas, an easier way for everyone, including scientists, to identify species is through the use of a two-word naming system called **binomial nomenclature**, which was developed by Carolus Linnaeus. For example *Homo sapiens* is the scientific name for humans.
   - T asks students to describe the physical characteristics of a banana tree and its fruits.
   - T explains the history of the banana and its physical make up and hybrids.
   - T explains the story of the once popular and famous and now very rare Gros Michel.
   - T explains effects of diseases on bananas.
   - T has students get into groups and answer the question:
     - What are the effects of a banana species if it is wiped out in American Samoa? Who is affected? What organisms are affected?
     - What are some possible solutions for replacing bananas used in the Samoan culture?
   - T allows for a representative from each group to stand up and explain their answer to the questions. Class discussion should ensue. Class exchange views and consider what should be done for the future of Samoa.
   - T models an activity on naming and writing using the green bananas.
   - T presents PowerPoint ‘Bananas of American Samoa’.

e. **FA’ATA’ITA’IGA FAIĀ’OGA (Teacher Model): (I Do)**
• Quick activity: T writes out KPCOFGS (Kingdom, Phylum, Class, Order, Family, Genus, Species).
  o T explains mnemonic device
  o T uses example of PEMDAS ‘Please excuse my dear aunty sally’ for the order of operation in math.
  o T circles Genus and Species and explains to the students the names of the organisms use genus and species as identification. It is almost like a first and last name. T writes first name and last name. First name can be seen as ‘species’ and the last name is the ‘genus’.
• T writes Homo sapien on the board and explains to the students how scientific names are formed and written.
• T types African bananas in Google and searches for a particular banana, writing the scientific name of the banana and the common name and how many possible varieties of banana there are in Africa.

FA’ATA’ITA’IKA/FA’ATINOGA FA’ATASI (Guided Practice): (We do)
• T and Ss start to work on a mnemonic device for KPCOFGS.
• T asks the class search the banana of their choice of country.
  o T write the scientific name and common name

FA’ATINOGA TA’ITO’ATASI (Independent Practice): (You do)
• Ss write in their journals their own mnemonic device of the KPCOFGS
• T assigns continents to each group and Ss individually research bananas of a different country and to write the scientific name and common name of the banana.
• Ss share with the class within a few days.

FA’AI’UGA (Closure)
Nature walk around a nearby plantation or field trip to Land Grant at American Samoa Community College.
T demonstrates how to make sua fa’i and passes out sua fa’i to the class for sampling.
MEAFAITINO (Resources/Materials, References):

- PowerPoint presentation ‘Bananas of American Samoa’.
- Projector or smart board
- Speakers
- A short video clip of ‘Minoi, Minoi, Minoi’ by the Laughing Samoans – 1:52:40 (‘Funny Chokes’ DVD) or a YouTube clip of ‘Minoi’ sung by choir.
- ‘Minoi’ lyrics
- Ripe and green bananas of 4 types of bananas
- Nature walk visit nearby banana plantation
- Clip art of banana tree with fruits from http://www.promusa.org/display2291
- Anoafale O le Gagana Ma Le Aganu’u: Tusi E Lua. by Pemerika L. Tauiliili
- Plants in Samoan Culture: The Ethnobotany of Samoa (2005) by Arthur W. Whistler
- Personal references: Rosalia Posala of Malaeloa and Aiava R. Talaeai of Ili’ili.
- Any biology textbook on taxonomy.
- Sua fa’i recipe in PowerPoint presentation.
- http://www.promusa.org/Morphology+of+banana+plant
- http://cwh.ucsc.edu/bananas/Site/Early%20History%20of%20the%20Banana.html
CITRUS FAMILY (RUTACEAE): Lemons, Solialofi Taematua; Oranges, Aveimalo Fasavalu

1. Names: Samoan, English, Scientific Family, Genus species
   * Buddha’s hand, Blood orange, Lime, Grid ascorbic
   * Samoan name: Tipolo
   * Scientific name: Citrus limon
   * Many lemons are oval in shape, others have different shapes
   * 2 main types of sour lemon are Eureka and Lisbon
   * Eureka generally texturized skin
   * Lisbon has smoother skin

2. Family history: Native or introduced by Polynesians or others, other familiar relatives in the family, 2-3 interesting things from science point of view
   * The other familiar relatives of lemon are lime and oranges
   * They used to treat scurvy caused by not having enough vitamin C
   * Used for common cold flu, ringing in the Ears (tinnitus), Menieres disease and kidney stones
   * Used to aid digestion and reduce pain and swelling
   * Improve function of blood vessels

3. Story: traditional or from an interview with an elder or expert (here’s the language arts part)
   * By interviewing an elder, I found lemon branches are used by Samoan people to husk the coconuts because it’s very strong, and the leaves are used too to make food delicious like
Samoan “Poi Fail” and also, leaves can be put inside the coconut and squeeze it together then eat it together with breadfruit that baked in a Samoan oven (umu).

*Lemon poem:

Tipolo, Tipolo,  
o lona fua e lapotopoto  
o lona pa’u e lanu meamata  
ae a pula ua lanu samasama

4. Cultural uses past, present, future potential:
   - Lemons can be used in art—cut in two pieces and use for the kids to draw their pictures.
   - People can grow and sell lemons.

5. Precautions: anything dangerous?
   Can be too sour if you add a lot or hurt if you get juice in a cut or your eyes,

LESONA (Lesson Title): HOW ARE WE Like LEMONS?  
MATĀ’UPU (Subject): Lemon

VASEGA ‘AMATA (Grade): ECE

TIME SPAN: We can take the children in a field trip to Land Grant, so they can see the different kinds of lemons and ask the Land Grant for some trees for them to grow.

GOALS OF THE LESSON: My goal is to let the students know the different shapes of lemons, are they big or small, what are the colors of lemon, counting using numbers and using objects. This lesson also shows children that like lemons, despite outside differences people are often similar on the inside.

MATĀTI’A MA ĀLĀFUĀ (ASDOE CONTENT STANDARD (S):  
MATĀTI’A (Strand): Life Science

SINI FA’AMOEIOEINA/TANU’UGA AUTŪ (Objectives):
- Physical: demonstrate find modal strength and coordination, use fingers and hands, use writing and drawing tools.
- Cognitive: show flexibility and inventiveness in thinking, recognize and recall. How are we like lemons? See activity below.
- Literacy: demonstrate knowledge of the alphabet, retell stories.
- Mathematic: count, explore and describe spatial relationship and shapes, compare and measure, demonstrate knowledge of patterns.
- Science & Technology: demonstrate knowledge of the physical properties of objects and materials.
- Social Studies: explore change related to familiar people or places.
- Art: explore visual art, music concept and expression.
- English Language Acquisition: demonstrate progress in listening to and understanding English.

**SU’ESU’EGA (Assessment Task):**
- Assets each child by shapes, numbers, colors, and letters.

**VA’AIGA LAUTELE (Overview)/FA’ALIOA LE ILOA (Prior Knowledge):**

**FA’ASOLOGA O A’OA’OGA (Instructional Procedures)** See activities in box

**GAIO’IGA TATA’I (Focusing Event):**
FA’ATA’ITA’IGA FAIĀ’OGA (Teacher Model): (I Do)
FA’ATA’ITA’IGA/FA’ATAROA FA’ATASI (Guided Practice): (We do)
FA’ATAROA TAITO’ATASI (Independent Practice): (You do)
FA’AIU’UGA (Closure)

**Activities:**
- Give 1 lemon to each child
- Ask the children to get to know their lemon
- Put a mark on each children’s lemon
- Tell the children to examine their lemons by, smell them, throw them in the air and roll them around.
- After few minutes, collect the lemon in a big basket & ask the children to find their lemons in the pile.
- Ask the children to describe how they recognized their lemons.
- Some children will say, my lemon was big, my lemon had a mark on one side, my lemon had bruises.
- The teacher will tell the children how people too come in different sizes, different shapes, different shades of color and different bruises

21. **MEAFAITINO (Resources/Materials, References):**
- Lemons
- Pictures
- Crayons
- Glue
- Posters
- Constructions
- Water Paints
- Brushes
- Pencils
CITRUS FAMILY (RUTACEAE) ORANGES

LEARN THE DIFFERENCES AMONG ORANGES HERE IN SAMOA

Aveimalo Fasavalu
Lupelele ECE

SAMOAN: NAME Moli
ENGLISH NAME: Orange
SCIENTIFIC FAMILY: Rutaceae
GENUS: Citrus
SPECIES: sinensis

Family history: There are sweet oranges, blood oranges, navel, and acid-less oranges.

STORY by Aveimalo Fasavalu

A long time ago there was an old man who lived on a mountain. He had an orange plantation. One day when the old man came out of his house and looked at his orange plantation, he saw something hanging down from the orange tree. So the old man looked and he found out it was an orange. The old man waited for the orange to be ready so he went back inside the house and waited for the orange to be ready. The old man waited and waited, one month later he went back out and he found out the oranges are starting to ripen, so he went back inside and he waited for few days. One week later the old man came back to see the orange and he found out the orange was changed from green to orange or yellow, so the old man thought now it’s time for me to get some oranges. So the old man climbed up the orange tree and got himself some oranges to eat.

When the old man came down from the orange tree, he saw a man standing under the orange tree. The old man asked him, “What do you want,” and the man said, “I came to look for some oranges for my wife.” So the old man told the man, “You can have some oranges, but before you go back we should eat the orange first.” So the old man and the man ate the orange and the
man found some seeds and he ask the old man, “What are these?” The old man said, “Those are the seeds. You can grow those and you will have some orange trees.” So the old man told the man to get some oranges for his wife and said, “But before you go back, remember when your wife eats the orange save the seeds.” So the man left with the oranges for his wife and when his wife ate the orange, the man told her to save the seeds for me to grow.” So the man grew the seeds, and later on after some months the man and his wife saw some orange trees growing next to their house. The man and his wife were very happy.

CULTURAL USES PAST, PRESENT FUTURE POTENTIAL:

They use the skin of the Samoan orange for their medicine and the fruit to eat, same as the sweet orange we have here in the store. We eat those. We use the leaves for tea or to give your food a taste of orange.

Precautions: anything dangerous?
There’s nothing dangerous about the Samoan orange, everything we use it for is ok.

VASEGA’AMATA (Grade): 3 & 4 years old
TIME SPAN: 1 to 2 hours

GOALS OF THE LESSON:
- The students will be able to identify the different types of oranges we had here in Samoa
- The students will be able to compare the different types of orange we had here in Samoa

MATATI’A ALAFUA (ASDOE CONTENT STANDARDS)
MATATII’A (Strand): Students can identify the different types of oranges here in Samoa.
ALAFUA (Standard): Students can compare the different types or oranges here in Samoa.
ALAFUA LAUTELE (Common Core Standards)

SINI FA’AMOEMOEINA/TAUNU’UGA AUTU (Objective)
- The students can identify and compare the different types of oranges here in Samoa.

SU’ESU’EGA (Assessment Task)
- Ask question: What did they learn from the lesson.?
- What color of the oranges?
- Where did they find those oranges?
- How does the orange feel?

VA’AIGA LAUTELE (Overview) FA’AILOA LE ILOA (Prior Knowledge)
- Let the student tell what they learn, by telling a story of what he or she sees in the classroom
- Review the day: questions like what did you see, or where do you find the oranges?

FA’ASOLOGA O A’OA’OGA (Instructional Procedures):
First day I will bring in different oranges that we have here in Samoa and show the students, and let them know their names. The next day we draw a picture and color, the other day we learn the
letter that start the word orange, by writing and sounding it out, and the other day we have a nature walk out of our classroom and find out if we can see any orange tree there.

GAIO’IG TAT’I (Focusing Event):
- Student will be able to identify and compare the different type of oranges we had here in Samoa.

FA’ATA;ITA’IGA FAIA’OGA (Teacher Model) (I Do):
- Show the oranges and explain to them which orange is that.

FA’ATA’ITA’IGA/FA’ATINOGA FA’ATASI (Guided Practice) (we do)
- Give all the students one orange and ask them how does the orange feel, how does it smell and what are shape and color of the orange.

FA’ATINOGA TA’ITO’ATASI (Independent Practice) (you do)
- The student will draw a picture of an orange and color it.

FA’AI’UGA (Closure):
- By the end of the week the students will learn the colors, the shape also the uses of different oranges. They can also compare the oranges in size.

MEAFAITINO: (Resources/Materials, References):
- Oranges, Paper, Crayons, Paintbrushes, Paint
DAISY FAMILY (ASTERACEAE): LETTUCES

**LETTUCE: HYDROPONICALLY GROWN IN AMERICAN SAMOA**

Claire Marisse A. Bacus-DeWees
Nu’uuli Vocational Technical High School

Names:
Samoan: lakisi
English: lettuce
Scientific: *Lactuca sativa* (Genus species)
Scientific Family: Asteraceae/Compositae – Aster family

Table 1. Scientific classification of lettuce

<table>
<thead>
<tr>
<th>Rank</th>
<th>Scientific Name and Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kingdom</td>
<td><strong>Plantae</strong> – Plants</td>
</tr>
<tr>
<td>Division</td>
<td><strong>Magnoliophyta</strong> – Flowering plants</td>
</tr>
<tr>
<td>Class</td>
<td><strong>Magnoliopsida</strong> – Dicotyledons</td>
</tr>
<tr>
<td>Order</td>
<td>Asterales</td>
</tr>
<tr>
<td>Family</td>
<td>Asteraceae/Compositae – Aster family</td>
</tr>
<tr>
<td>Genus</td>
<td><em>Lactuca L.</em> – lettuce</td>
</tr>
<tr>
<td>Species</td>
<td><em>Lactuca sativa</em> L. – garden lettuce</td>
</tr>
</tbody>
</table>

Source: [http://plants.usda.gov/core/profile?symbol=LASA3](http://plants.usda.gov/core/profile?symbol=LASA3)

**Family history in American Samoa:**
Lettuce was initially introduced in 1983 by Mr. Larry Hirata as a cash crop grown at the Hirata Farm in Mapusaga. Its production was further studied and encouraged by the American Samoa Community College Community and Natural Resources Division (ASCC-CNR, Land Grant) as
well as the American Samoa Department of Agriculture as a means of promoting agricultural sustainability. Currently, American Samoa has 2 locally grown lettuce products at the markets under the brand names Salad Pak and Tutuila Green; other local farmers who are growing lettuce hydroponically sell their produce to the Lunch Program.

**Health Benefits:**

1. **Helps Weight Loss**

   Lettuce contains fiber and cellulose that helps you fill up and improve your digestion. Fiber also helps remove bile salts from the body. When the body replaces these salts it breaks down cholesterol to do so.

2. **Helps with Insomnia**

   The white fluid that you see when you break or cut lettuce leaves is called lactucarium. This has relaxing and sleep inducing properties similar to opium but without the strong side effects.

3. **Low Glycemic Index**

   Lettuce has an average glycemic index of 15, but because it has so few calories, its glycemic load is considered zero. Foods with low glycemic indexes are great for anyone watching their blood sugars for medical reasons, or for weight management.


   Although lettuce is grown for its edible leaves, other plants grown in American Samoa under the same family, Asteraceae or Sunflower family, are grown for beautification and some are even considered weeds.

   **Marigold:** *Tagetes erecta*

   **Zinnia:** *Zinnia elegans*

   **Beggar’s tick:** *Bidens alba*

   **Wedelia:** *Wedelia trilobata*

   Sources:
   - Almanac.com
   - parkwholesale.com
   - Photobucket.com
   - Floridaflowerpower.com
Story of Lettuce:

The ancient Greeks believed that lettuce induced sleep, so they served it at the end of the meal. The Romans continued the custom. However, the dictatorial Emperor Domitian (81-96 AD) served it at the beginning of his feasts, so he could torture his guests by forcing them to stay awake in the presence of the Emperor.

The lettuce that we see today actually started out as a weed around the Mediterranean basin. Served in dishes for more than 4500 years, lettuce has certainly made its mark in history with tomb paintings in Egypt and identification of different types of lettuces by various Greek scholars.

Christopher Columbus introduced lettuce to the New World as early as 1494. And from that date onwards lettuce was cultivated. Thomas Jefferson had 19 varieties of lettuce growing in his garden at Monticello. Iceberg lettuce got its name from the fact that California growers started shipped it covered with heaps of crushed ice in the 1920s. It had previously been called Crisphead lettuce. (Source: http://www.foodreference.com/html/flettuce.html)

1. Cultural uses past, present, future potential:
   Lettuce has been, is, and will be used for food, as a source of fiber, vitamins, and minerals. The American Samoa Department of Education has lettuce salad as one of its dishes for school lunch so as to encourage a healthier diet among students while the American Samoa Department of Agriculture is encouraging more farmers to grow lettuce to promote agricultural diversity and sustainability.

2. Precautions: anything dangerous?
   Buy locally produced lettuce so as to reduce risk of eating a lot of pesticides in your salad. Lettuce is one of the crops that is listed in the dirty dozen (crops that are grown with high quantity of pesticides) unless grown organically in the United States of America.

LESONA (Lesson Title): Growing Lettuce Hydroponically

MATĀ’UPU (Subject): Science/Agriculture

VASEGA ‘AMATA (Grade): K-12

TIME SPAN: 2.5 hours for field trip and set-up (Field trip choices: Hirata Hydrogarden, Chang’s Aquagarden, American Samoa Community College Community and Natural Resources Division (Land Grant), and/or American Samoa Department of Agriculture)

   60 days to grow lettuce from seed to harvest size
   2 hours to enjoy produce

GOALS OF THE LESSON:
   • Expose students to another method of farming.
   • Encourage students to grow their own vegetables and eat them.
MATĀTI’A MA ĀLĀFU'A (ASDOE CONTENT STANDARD(S):)

MATĀTI’A (Strand): Life Science

ĀLĀFU'A (Standard): Std. 7: Students examine organisms’ structures and functions for life processes including growth and reproduction.

                K.7.2. Recognize that plants and animals have needs that must be met in order to survive.

SINI FA’AMOEEOEINA/TANU’UGA AUTŪ (Objectives):

- The students will be able to grow lettuce hydroponically.
- The students will be able to prepare and enjoy a dish using harvested lettuce.

SU’ESU’EGA (Assessment Task):

Be able to discuss: where lettuce is grown in American Samoa; the main steps in growing lettuce; what lettuce needs to grow; harvesting and preparing a dish with lettuce.

VA’AIGA LAUTELE (Overview)/FA’AILOA LE ILOA (Prior Knowledge):

- Life cycle of a flowering plant: seed, seedling, flowering plant, then, fruiting plant.
- Parts of a plant and the function of each part: roots: anchor the plant and absorb water and nutrients, stem: transports water and nutrients throughout the plant, leaves: produce the plant’s food through photosynthesis, flowers: reproductive organ of the plant, and fruits: protect the seed.
- Factors needed by plants to grow: sunlight: for photosynthesis, water: to transport nutrients, air: photosynthesis and cellular respiration (breaking of sugar to transform it to energy in the form of ATP, adenosine triphosphate), and nutrients: to ensure healthy growth of plants.

FA’ASOLOGA O A’OA’OGA (Instructional Procedures)

GAIO’IGA TATA’I (Focusing Event):

- Show hydroponics setup with ready to harvest lettuce. What do students know about lettuce and hydroponics?
  Note: The field trip is the alternative to this.

FA’ATA’ITA’IGA FAIĀ’OGA (Teacher Model): (I Do)

Part 1: Setting up the hydroponics box

- Fill the container with rain water
- Add fertilizers to the rain water (10 mL per gallon for each solution or otherwise advised by the fertilizer label)
- Plug in net pots with seedlings or sown seeds in it
Note: acquire fertilizers and net pots from field trip sites. Please inform field trip sites at least two weeks prior to scheduled trip.

Part 2: Harvesting and preparing the lettuce dish
- Show students how to harvest lettuce: break stem off from the end of the net pot or pick ready to eat leaves individually
- Demonstrate how to prepare a lettuce salad or assemble a sandwich with lettuce.
  ✓ Lettuce salad: break lettuce leaves into smaller pieces and put in a mixing bowl then add diced tomatoes, shredded carrots and salad dressing of the person’s choice
  ✓ Tuna sandwich: spread mayonnaise on one side of a loaf of bread, put lettuce on top of the bread, spread prepared tuna spread on top of the lettuce and cover with another slice of bread.
  ✓ Burger: Spread mayonnaise on both sides of the inside of a hamburger bun, add in layers: sliced cheese, lettuce, burger patty, spread ketchup on top of the patty, sliced cheese, and close with the other part of the bun. Optional: add tomatoes, pickles, and onions.
- Eat prepared dishes with students after everybody has prepared his/her own.

FA’ATA’ITA’IGA/FA’ATINOHA FA’ATASI (Guided Practice): (We do)
- Students work in groups and do what the teacher has done.

FA’ATINOHA TA’ITO’ATASI (Independent Practice): (You do)
- Student prepares the dish and takes it home for parents to taste and appreciate.

FA’AI’UGA (Closure)
- Students share their experience of growing lettuce and actually eating it.
- Students share what their parents said and their response when they ate the dish.
- Plant new sets of lettuce seeds or seedlings.

MEAFAITINO (Resources/Materials, References):

Mr. Larry S. Hirata
Hirata Hydrogardens (located at the back of Lavaei Apartments in Ili’ili)
P.O. Box 2145, Iliili, AS 96799
Phone: Landline: 684-699-6325 Cell: 684-733-9869
Email: lhirata@rocketmail.com

Jennet Norie Lisa Chang
Chang’s Aquagarden
Phone: 684-272-6329
Email: jnlchang@gmail.com

GINGER FAMILY (ZINGIBERACEAE): RED GINGER, Ili T. Sitivi

Ilī.T.Sītīvi

Teuila- Red Ginger

School


Names: Samoan, English, Family name, Genus species

Teuila- Red Ginger, Alpinia purpurata
- Family Name: Zingiberaceae
- Genus: Alpinia
- Species: purpurata
- Synonyms: Guillania Purpurata

Family history: Native or introduced, familiar relatives in the family
This plant has been said to grow in the following regions: Camarillo (CA), Silt Colorado, and the Pacific Islands. Common Names: red ginger, ginger, pink cone ginger, fire ginger, ostrich plume, pinecone ginger. Hawaiian Name: ‘awapuhi ‘ula ‘ula. It is widely cultivated in the tropics and subtropics. It grows well in rich soil and in wet habitats, but it can grow in dry areas as well. Red ginger is quite popular as an ornamental and cut flower, both for the home and for commercial sale.

Story:

The Red Ginger is very popular in Samoa and has been adopted as the symbol of Samoa. There it is called the Teuila and every year the country holds the Teuila Festival with lots of fun activities. The plant grows well there in the hot and humid climate. There is a very interesting note in Isobel Field's 1937 autobiography, "This Life I've Loved," about how she introduced the Red Ginger to Samoa for the garden up at Vailima and how it got its Samoan name. Isobel was the stepdaughter of the writer Robert Louis Stevenson who, along with his family, established a home in Samoa around 1890. While there Isobel was given the name Teuila by the Samoans as she liked to beautify people and place. To quote Isobel: "Believing that lovely flowering plant, the sweet-scented ginger, would grow at Vailima, I sent to Honolulu for some roots. Soon they were blossoming everywhere, and the natives, admiring their perfumed beauty, paid me a pretty
compliment. To this day the sweet-scented ginger that grows so luxuriantly in Samoa is called the "Teuila flower." I like to think of this, and that "my flower added a new fragrance to our dear Island." Samoa’s favorite flower, the red ginger, has blossomed into the South Pacific’s #1 event, the annual Teuila Festivities held in the center of downtown Apia (Western Samoa- Capital).

**Cultural Uses:** In our Samoan tradition we use the petals to make leis, and the flower for arranging bouquets of flowers for the church or the hospital. The red ginger petals are also used in our Samoan formal wear in the past years and throughout this generation to design formal wear for a Samoan girl/boy to compete in any event held here or the South Pacific such as the Miss American Samoa Pageant.

**Precautions:** anything dangerous?

There are no dangers but there are side effects if consumed:

- Heartburn
- Diarrhea
- General stomach discomfort
- Some women have reported extra menstrual bleeding
- Skin irritation
- Not enough is known about ginger while breastfeeding so just to be on the safe side-don’t use it while breastfeeding.

**LESONA (Lesson Title): The Teuila Flower**

Samoan Name: Teuila
English Name: Red-Ginger, Pink Cone Ginger, Ostrich plume
Hawaiian Name: ‘Awapuhi ‘ula ‘ula
Scientific Name: *Alpinia purpurata*
* Native in Malaysia and introduced to all the Polynesian Islands.

**MATĀ’UPU (Subject): All Subject// Mataupu Uma**

**VASEGA ‘AMATA (Grade): ECE-Level**

**TIME SPAN: 2-3 hours (includes field trips)**
- 15 minutes/ Nature Walk to any nearby garden to let children see the beauty of red ginger in landscaping and for decorating a house’s landscape.
- After the nature walk students will have the opportunity to draw their pictures of a Teuila flower.
- Teach students the different parts of the red ginger, Teuila.
- Invite a parent who loves to arrange bouquets of flowers to give a demonstration for the students.
- Alu se savaliga I se pa la’aou e lata ane ile faleaoga e matamata ai tamaiti ma fa’ailoa I tamaiti le ta’ua o lenei la’aou o le Teuila. Fa’ailoa I tamaiti vaega uma o the Teuila ma fai fesili e iloa ai ele faiaga ua alu ma le atoa lona iloa I le mataupu. Tu’u se avanoa I tamaiti e ta’u mai so latou iloa I lenei la’aou o le Teuila.
GOALS OF THE LESSON: Write 1 or more primary goals of the lesson

- Students will use language to express thoughts and needs by using an expanded expressive vocabulary, speaking clearly or using conventional grammar to show an understanding about the Teuila.
- Ia mafai ele tamaititi ona fa’ailoa mai ona lagona e fa’amatala mai ai le aoga o le Teuila, e fa’atupulaia ai le gagana tautala a le tamaititi. E toe alualu ai luma lona taumafai ma taumafai e ta’u mai upu a’oa’o o lo’o I le la’au o le Teuila.

22. MATĀTI’A MA ĀLĀFU'A (ASDOE CONTENT STANDARD(S):

MATĀTI’A (Strand):

ĀLĀFU'A (Standard):

Benchmark (La’asaga):

23. SINI FA’AMOEMOEINA/TANU’UGA AUTŪ (Objectives):

- Students will be able to name all parts of the plants and demonstrate knowledge of the basic characteristics of the Teuila plant
- Ia mafai ele tamaititi ona fa’ailoa mai vaega uma o le la’au ma fa’ailoa mai o latou igoa.

24. SU’ESU’EGA (Assessment Task):

- Students will design their art using the petals of the Teuila. They will also label the different parts of the Teuila plant to show they understand about the plant characteristics.
- Ia mafai e le tamaititi ona fa’aaoaga lau o le Teuila e fai ai lana ata. Ia mafai foi ona fa’ailoa mai vaega uma o le Teuila.

25. VA’AIGA LAUTELE (Overview)/FA’AILOA LE ILOA (Prior Knowledge):

- Teacher will ask questions such as “Where do they see the Teuila flower?” to gain some knowledge from the students about the Teuila flowers and to easily focus all activities through out the week.
- Fesiligia muamua tamaiti ise iloa e uiga I le Teuila. Ona saunia loa lea o fesili e fa’atupulaia ai le lagona o le tamaiti e uiga I le fugala’au o le Teuila.

26. FA’ASOLOGA O A’OA’OGA (Instructional Procedures)

- GAIO’IGA TATA’I (Focusing Event): Separate students into two groups and give them each Teuila plant.

- FA’ATA’ITA’IGA FAIĀ’OGA (Teacher Model): (I Do) Show students the Teuila plant. Ask the students about the Teuila flower. Then have students volunteer about telling about the Teuila and other parts of the plant: roots, stems, leaves, and flowers.
i. FA’ATA’ITA’IGA/FA’ATINOOGA FA’ATASI (Guided Practice): (We do)
Give students white plain paper and crayons to draw the Teuila flower in ways the teacher
identifies that each student understands about the Teuila.

o. FA’ATINOOGA TA’ITO’ATASI (Independent Practice): (You do)
(Nature Walk)- 20 minutes to a nearby garden to identify which are the Teuila plants and
have the students to name all parts of the Teuila plant or ask questionsn about “Who do
you think planted the Teuila?—Why do you plant the Teuila plant?—After, teacher will
use the Google Map to show where they actually have gone to visit.

FA’AI’UGA (Closure)
Allow students to present their drawings and also ask questions about the Teuila plant.

27. MEAFAITINO (Resources/Materials, References):
ECE Curriculum, Google map,

“This Life I’ve Loved,” Autobiography of Isobel Field,
http://babel.hathitrust.org/cgi/pt?id=uc1.32106010711544;view=1up;seq=11
MULBERRY FAMILY (*MORACEAE*) ‘ULU/BREADFRUIT

BREADFRUIT
FAASOLO TAGO
TAFUNA ECE

Breadfruit is a very large evergreen tree found commonly in the tropical rainforest of Indonesia, Philippines, Sri Lanka and southern India. It actually used as subsistence food in line with other tropical staples such as rice. There was only one variety of breadfruit in the early Pacific. Its fruit bearing season was June, July and August. Therefore, breadfruit was not considered of primary importance in the early Samoan diet. The mature fruit was broiled over coals or cooked in the umu. It was eaten in this form or pounded in the Samoan Tanoa. Ripe uncooked fruit was mashed, mixed with coconut cream, wrapped in the banana leaves bundles to get ready to eat, and that what you call pe’epe’e ulu.

1. **Names:**
   - **Samoan:** ‘ULU
   - **English:** BREADFRUIT

   Scientific Family: *Artocarpus altilis* is a member of the *Moraceae* (fig) family. The scientific or Latin name is derived from Greek (*artos* = bread, *karpos* = fruit) and *altilis* means “fat.”

2. **Family history:**

   Native or introduced by Polynesians. The wild ancestor of breadfruit, *Artocarpus camansi* (breadnut) naturally occurs in New Guinea, the Moluccas (Indonesia, and possibly the Philippines. The third related species, *Artocarpus mariannensis* (dugdug or chebiei) grows wild in Palau and the Mariana Islands. The nutritious fruits and seeds of all three species are edible. The multipurpose trees are easy to grow, beneficial to the environment, and produce an abundance of nutritious, tasty fruit. They also provide construction materials, medicine, fabric, glue, insect repellent, animal feed and more.

   Breadfruit is a fruit though we use it like a vegetable when green. It grows from a flowering tree called ‘*Artocarpus altilis*’. The breadfruit tree is a member of mulberry family, and therefore is often considered a type of mulberry.
3. Personal Story:

One day I woke up at my house in Nuu‘uli, I went to pick up the trash means breadfruits leaves that falling down everyday, and I was trying to get the yellow one is on the trees, and that’s where I found the different color on our breadfruit leaves, and I went in the house and tell my dad about what happen. My dad game out and look on the breadfruit tree, at the said time he told me to climb up and get it for him to look at it, if is true the same time he call the (TV) to put it on the news, and the next day people starting came over to our house and take pictures of this thing ever happen in our land or our home.

4. Cultural uses past, present, future potential:

Initially cultivated as a bread substitute breadfruit is now commonly used to replace starchy vegetables, pasta, or rice. The fruit is most often consumed when it is mature, but still firm. Methods of cooking mature fruits include roasting, steaming, or baking. However immature fruits can also be cooked by boiling, pickling, or marinating, imparting a flavor that is said to be similar to that of artichoke hearts. Sliced fruit is sometimes fried to make chips, or it can be candied. And also, more in the old days, Samoan people used to put it in the ground, leave it for 3 days then bring it back up to make masi Samoa; we use it on Samoan crackers.

Breadfruit has many health benefits, and these benefits are evident on skin and the hair. Breadfruit is rich in fiber. The fiber content of the vegetable provides a person relief suffering from diabetes. Researches made on this fruit have established that regular intake of breadfruit can reduce the risk of diabetes and keeps the same under control. It does so by reducing the absorption of sugar by human body from the food.


LESONA: BREADFRUIT – ULU

MATA’UPU (Subject): Science
VASEGA AMATA (Grade): ECE

TIME SPAN: 45 minutes
GOALS OF THE LESSON: Write 1 or more primary goals of the lesson.

- Students will identify different types of Breadfruit.
- Students will draw and color the breadfruit.

1. MATATIA MA ALAFUA (ASDOE CONTENT STANDARD(S):

MATATIA: (Strand): Characteristics of Organisms
ALAFUA(Standard): PKSb The student will demonstrate an understanding of the similarities and differences among living and non-living things
Benchmark (Laasaga): PKSb.1: Recognize the similarities and difference in animals and plants (color, size, appearance, etc.)

2. SINI FAAMOELELEFA/TAUNUUGA AUTU (Objectives):
   - Students will be able to identify parts of a breadfruit.
   - Students will able to match parts of a breadfruit
   - Students will color picture of breadfruit.

3. SUESUEGA (Assessment Task):
   Match the pictures of breadfruit.

4. VAAIGA LAUTELE (overview) FAAIOLOA LE ILOA (Prior Knowledge): Name some of the breadfruits that are found in American Samoa.


5. FAASOLOGA O AOAOGA (Instructional Procedures)
   a. GAOIOIGA TATAI (Focusing Event)
      Usu se pese/tauloto.
      Laau tetele tupu taufelefele, e fiafia ai manulele, laau ole ulu e tupu taufululu, e fiafia ai le atunu.

      Song: Outou teine ole atunu, sa ou faapea ele valea lou ulu, tama mai meleke ua taunuu, ae maua ai loa teine I lalo o ulu, sue mai se mama e faamaulu, ae le masani ai ona tupu, na ole usu ile togaulu e toil mai ni ulu e fai se umu.

      Ch: sosola uma o saila mai meleke, tiai oe ile faletele, ua uma na ou fai atu aua ete mateletele, ete iu lava ile tusameme.

   e. FAATAITAIGA FAIAOGA (Teacher model): (I do): Teacher will demonstrate how to draw picture of breadfruit, and then students work on one by one to trace breadfruit leaves, or breadfruit seeds. Ask student what they know about the breadfruit plant.

   i. FAATAITAIG/FAATINOGA FAATASI (Guided Practice): (We Do) Give students a worksheet of the breadfruit and have them label the plant. Then discuss it with students the use of each part of the breadfruit tree.

   o. FAATINOGA TAITOATASI (Independent Practice) (You Do): draw a picture of your favorite breadfruits (etc.) Avelolo’a, Puo’u, Ma’afala, Maopo, ulu e’a, ulu lega. List what part of the plant they see. Ask students questions: who do you think plant the tree? Who do
you think planted here? How did it get here? At the same time make sure they are labeling where to find the breadfruit.

FAAIUGA (Closure)
*Students will present their work (Independent Practice) to the class.

6. MEAFAITNO (Resources/materials, References):
- Pepa tusi ata, penitala, penivali, internet, ulu, lauulu.
- Construction papers, clues, cutting paper, to do collage.
- Story of the Breadfruit, Poems, Songs

7. Reading:
- Read a story about breadfruit.
- Sound out the beginning words
- Read poems
- Complete the sentences with the correct word

8. Math:
- Identify at least 4 kinds of shapes, circles, triangles, and squares
- Recognize colors
- Sort and classify

9. Social studies:
- Define the word: breadfruit
- Identify the importance of the breadfruit?

10. Gagana Samoa:
- Talanoa I le aoga o ulu o loo I luga o le fogaeleele,
- Vaevae upu silapela
- Talanoa I vaelei ma konesane.
PAPAYA FAMILY (CARICACEAE): PAPAYA

LESONA (Lesson Title): PLANT - ESI
Mataupu (Subject): SCIENCE
VASEGA ‘AMATA (Grade): Level - 2
TIME SPAN: 45 minutes (does not include field trip and observing seeds sprout)

GOALS OF THE LESSON:
Students describe the life cycle of a plant from seed to sprout, to adult, to fruits, flowers and seeds.

1. MATATI’A MA ALAFUA (ASDOE CONTENT STANDARD(S):

MATATI’A (Strand): LIFE SCIENCE
ALAFUA (Standard): Standard 7: Students examine organisms’ structures and functions of life processes including growth, and reproduction. Topics include structures, processes, growth and development, reproduction, heredity genetic and law of energy and matter within organisms.

Benchmark (Laasaga): Investigate the life cycles of plants.

1. SINI FA’AMOEMOEINA/ TANU’UGA AUTU (Objectives):
   - Students will be able to describe the life cycle of a papaya plant.
   - Students will be able to draw and identify the life cycle of a papaya plant.

2. SU’ESU’EGA (Assessment Task):
   - Worksheet- students will label the life cycle of a papaya from the seed to sprout, to adult, to fruits, flowers and seeds again
   - Describe the life cycle of a papaya plant and what is the function of the seeds, roots, leaves and fruit.

3. VA’AIGA LAUTELE (Overview) FA’AILOA LE ILOA (Prior Knowledge):
   - Name plants that are found in American Samoa that we can eat.
   - Use a web to list plants that are found in American Samoa that we eat.
   - Ask questions which relate to the papaya plant
   - What does a papaya look like? Where do you see a papaya plant? Does your family grow papaya? Why does your family grow the papaya plant? What birds eat the papaya fruits? How many seeds are in a papaya? Depending on the type of papaya between 100-400.

4. FA’ASOLOGA O A’OA’OGA (Instructional Procedures)
   a. GAOIO’IGA TATAI (Focusing Event):
      Song(pese) Laau tetele tupu taufelefele e fiafia ai manulele, laau feololo o le fua e sosolo e sui ai sau faasolo, laau lilii e tupu e tafitifiti e fiafia o tamaiti.
      Laau o le esi laau aoga e fiafia ai o tama ma tina.

   b. FA’ATA’ITA’IGA FAIAOGA (Teacher Model) (I Do)
      (1) muamua: faaoga le web o mea ua uma ona iloa e tamaiti I laau e toe amata ai le lesona. Use the web from their prior knowledge to start your lesson. Point to different plants on the board and have students say their names.

      (2) Faailoa i tamaiti le Autu o le lesona, Write the objective of the lesson on the board and read it to the students: Students will describe the life cycle of a papaya plant, draw and identify the functions of the papaya.

      (3) Tusi le ata o le esi i luga o le laupapa, pe faaoga se siata e faamalamalama ai le olaqa o le esi. Draw the papaya plant on the board. Tell students the parts of the Esi and their function/life cycle.
(4) Faamatala se tala i le mafuaaga o le esi: O aso anamua sa iai se ulugalii e igoa ia Fatu ma Esi. E nonofo i le vaomatua ma o lenei ulugalii e leai se la fanau. Sa mananao lava laua i se fanau. Sa galulue lava i le la faatoga talo ma fa’i. A uma a galuega i le afiafi, ona sauni loa lea e vai le la meaai. E muamua lava tatalo i le ATUA e faamanuia mai laua i se fanau. Sa faia pea la galuega masani ae faafuasei ona ma’i Fatu ma iu ai i se tulaga ese lona gasegase. Ae lei oti/maliu Fatu sa fai ai lana mavaega ia Esi e faapea:”Esi o oe o si ou toalua pele ma o oe o lou Fatu, a ou oti ia e toto lou tino i le ta fa’atoaga a ola mai ai se laau ona tausi lea faapelepele ia te ia .” Sa faia lava e Esi e tusa ma le lala a Fatu. Na maliu Fatu ma ua tanu i le maumaga lona tino. Ao faia pea galuega a Esi i se tasi aso sa vaaiia ai loa ua ola ai se laau ma sa faapena ona tausi faapelepele e Esi. Sa ola ma fua lenei laau ma vaaiia ai e Esi lona fatu. Sa toto e Esi le Fatu o le esi ma toe maua ai isi esi e tele e oo mai i le taimi nei ma faaigoa ai loa e Esi o Fatuesi ma le la fanau e fananau mai i le fatuesi.

c. FA’ATA’ITA’IGA/FA’ATINOGA FA’ATASI (Guided Practice): (We Do)
- Tufa pepa (siata) i tamaiti kulupu tai 2-3.
- Group work (2-3 students in a group) pass out construction papers, have students draw pictures of the life cycle of a papaya. Assign students each task; planting the seed/sprout/plant/plant with fruit; repeat the cycle.

d. FA’ATINOGA TA’ITO’ATASI (Independent Practice): (You Do)
- Tusi mai i le faasologa sao le life cycle of Esi. Seed (fatu), sprout (matala/olaola) adult (matua) to flower (fugalaau) frui (fua),seed (fatuesi)

5. FA’AI’UGA (Closure)
- Faamatala le olaga o laau(esi). O le a le aoga o le esi? O le aoga o le esi i le atunuu ma le aganuu. Ask students to name some useful aspects of the papaya plant/seed/leaves/fruits.
- Sing Eensy Weensy Spider: Eensy weensy Spider went up the Esi trunk. Down came the rain and wash the spider down. Out came the sun and dried up all the rain so Eensy Weensy went up the Esi trunk again.

6. MEAFAITINO (Resources/Materials, References):
- Note: Teacher will provide papaya seeds, plastic water bottle.
- Students will start growing their seed using napkins, tape and soil.
SOURSORP FAMILY (*ANONACEAE*): MOSO’OI/YLANG-YLANG

“What Do We Know about the Ylang Ylang Tree?”

Senerita Siimalevai

Mt. Alava

Names:
Samoa: Moso’oi
English: Perfume Tree
Common Name: Ylang Ylang
Scientific Family: *Annonaceae*
Genus: *Cananga*
Species: *odorata, latifolia*

Family history: The original home of Cananga is probably South East Asia. However, it is now naturalized in Burma, Malaysia, Indonesia, Papua New Guinea and Pacific Islands and the Philippines. It has been introduced into tropical countries in Africa, Asia, the Caribbean and the Americas, specifically as an essential oil plant. The tree requires a moist tropical climate and grows well in rich volcanic soils or fertile sandy loams. It grows both in vine and tree form. The vine bears flowers early and more blooms with fragrance in the evening when the flowers get yellow.

Interesting science point of view:

How do they get food?

The roots of *Cananga odorata* absorb water and its leaves absorb light energy to make sugars, chemical energy, in the process of photosynthesis. The ylang-ylang tree has energy-absorbing patterns that are consistent throughout the year. The young leaves and the fall of leaf come in December and February (first dry season); flowers come out most around January and April (first dry and first wet season), and ripe fruits come in July-August (the second dry season). Most energy is collected while the flowers fully bloom. The wide petals on the flower receives a greater amount of energy partly due to more surface area. This *Cananga odorata* grows best on a medium to low salt toleration, with an average, well drained soil. Growing the Ylang-ylang tree does not require an exact regulation of being watered. Providing liquid fertilizer every month would show a good result on the tree.

Reproduction:
The Ylang-ylang is usually propagated by its seeds. Direct-seeding in the fields is mostly practiced. But, another method is to collect small seedlings that grew about 4-8 inches already from under wild trees, and grow them out in bags for 2-3 months. The flowering of the ylang-ylang tree happens all year-round, and the black, fully ripe fruits can be found at any time of the year. And in each fruit, 6-12 seeds are found in an embedded oily part of the fruit. The seed is
removed and cleaned under water and should be dried under the shade before planting. The seeds grow best when it has been dried for around 6-12 months. The dried seeds are to be put under hot water then planted. The seeds are grown in pots until it grows to about 8-12 inches to be planted in the fields.

When seeds are grown, the area is made ready for planting the seeds. The area is cleared of weeds and is dug to about 20 inched deep. Seeds are planted usually as deep as 2-3 centimeters. Sowing the seeds around each area of trees would be recommended so that the area would not have to be reseeded.

**Story: “The Legend of the “Ylang Ylang Tree – Perfume Tree”**

A long, long time ago, the goddesses were in charge of selecting which trees of the forest were worth their blessing to bear flowers. One tree, which hadn’t been blessed to bear flower was the ylang-ylang tree. This made ylang-ylang so sad because he wanted to bear flowers. Ylang-Ylang overheard nearby trees talking proudly about their beautiful flowers to another. This made him sad and he cried all night learning that other tree are admiring all the other trees but him.

Then it rained so hard one day and it looked like a storm was coming. All the flowering trees prepared for the storm. They all clung tightly on the ground and their flowers clung to the trunks so the strong storm wouldn’t carry their precious flowers away. On the other hand, the ylang-ylang was not concerned, as he didn’t have any flowers to worry about. While it was pouring rain, two wooly worms in the distance were looking for shelter. Both had asked other trees but no one would help them or was willing to give them shelter. The flowering trees were afraid that the worms might eat their flowers. The wooly worm kept searching with the fear that they would soon be swept away by strong currents of water and stormy winds. Then the Ylang-ylang tree called out for them to stay in the shelter of his trunk as long as they lived and to eat from his leaves. The ylang-ylang tree thought that the worms lives were more important that his own leaves. The worms were actually caterpillars that grew into beautiful butterflies.

The goddesses heard about the good news and what the ylang-ylang tree did to save the caterpillars so they graciously gave their reward to the tree. They told him because you weren’t thinking of yourselves but others you will bear you flowers that look like the butterflies that you sheltered. Not only that, you will also bear fragrant flowers that will be admired by all other flowering trees in the forest.

**Cultural uses past, present, future potential:**

Moso’oi flowers are used for making fragrant oils and leis in American Samoa. They are one of three flowers used in the perfume Chanel No. 5.

**Precautions:**

1. This oil can be harmful to those who have sensitive skin and can give an irritation. It is very uncommon to cause an irritation to most people, but if an irritation were to form on the skin, it can damage, and give the skin a rash.
2. When the oil is used, the bottles are thrown away. The small amount of oil can go into the ocean, and increase the pollution in the water. Also, the smell of the oil, being very strong, is not a healthy chemical for our atmosphere.
3. A poor quality ylang-ylang flower can smell so terrible that it can give a bad reputation to the essence altogether. A very poor quality Ylang-ylang oil can be an unbearably unpleasant odor. The bad odor smells sharp, heady and peppery-dry.

4. Essential oils of the Ylang-ylang must not be used by any pregnant women without the advice of prior professional aromatherapists. Those people who suffer of chronic illness are warned to keep away from the scent of this Ylang-ylang perfume. Young children and babies are highly kept away from the overdose of smelling the Ylang-ylang. This Ylang-ylang can cause a slight nausea and headaches if it is used and smelled in high concentration.

LESSON TITLE: “WHAT DO WE KNOW ABOUT THE YLANG YLANG TREE?”

Grade: 4
Time Span: 45 minutes in class does not include nature walk
Goals of the lesson: Students will be able to label and list importance of the Ylang Ylang Tree.

ASDOE content standards:

MATATI’A (Strand): LIFE SCIENCE

Benchmark: Investigate the different structure and function of plants.

Objective(s): SWBAT identify and map where to find “Ylang Ylang Tree”.

Assessment Task: Students draw the picture of the Ylang Ylang tree and label its parts.

Overview/Prior knowledge: Name plants that are found in American Samoa.

Instructional Procedure(s):

Focusing Event: Read:” I am tall, with broad green leaves, and yellow flower that you could smell from a distance. Who am I?” Ylang Ylang Tree (Mosooi)

Teacher Model: (I do) Show students a plant (for example, a small papaya plant). Ask student what they know about the plant (trunk, leaf, root, and flower). Put Ylang ylang flower in a box and send it around and have student smell it and guess what they think it is? How is the Ylang ylang flower used?

Guided Practice: (We do) Give students a worksheet of the plant and have them label the plant. Give them map of the community and discuss how I will be used. They can find a familiar place on the map to be sure they know how to use it. Then discuss with students the use of each part of the tree and how they will use their knowledge on a nature walk.

Independent Practice: (You do) (Nature walk can be at least 30 to 35 minutes long) Give students a map of the community they will visit and discuss it with them. Take students for a “nature walk” in the community and identify Ylang Ylang trees. Then have students list the parts of the plant they see. (Ask students some questions: “Who do you think planted the tree? Why do you do you think the planter planted it at this place? If it’s not a human planter then: Who do you think planted here? How did it get here?” (Fruit bats eat the ripe, fragrant dark blue fruits and carry the seeds around.) At the same time make sure they are labeling on the map where to find
the Ylang Ylang tree. Take students on a “nature walk” to identify where they are located in the map and where we find the tree using the Google map. Then have them draw a picture of the Ylang ylang tree, label it, then present to the whole class.

**Closure:** Allow groups of students to present their map and their tree.

**Resources/Materials, References:** Google map showing where Moso’oi is found.

**INTEGRATED LESSON PLAN:**

**Reading:** This can continue up to five days: 1st day list words while under the Ylang Ylang tree, 2nd start prewriting the poem (at least four stanza, 3rd Edit the writing by having another students editing another students paper, 4th Rewrite using any form of writing and then the 5th day Publish it, have each students read their poem to the whole class while a student records another students on video camera. Then the whole class does a reflection of the whole class’s poem by watching the video again on TV. During the Nature walk have them sit quietly under the Ylang Ylang tree for 15 minutes, have them close their eyes and think and write as much as they can of what they see, feel, smell, touch while under the tree. Then have them write a poem title “While I’m under the Ylang Ylang Tree”

**Samoan:** They will translate their English poem into a Samoan version of and follow the same schedule of how the English was done for each day. This time every thing has to be in Samoan.

**Math:** Create a chart of how many tree they found during the Nature walk. Then they could us the scale on the map to measure the distance between each ylang ylang tree. They could also measure the height of each Ylang Ylang tree. They could find out how old each tree is they know the owner and make a bar graph of number of trees of specific ages.

**Social Studies:** They create a map of, where they find Ylang Ylang tree at? They will use “the google map” to map places on the computer. Invite an elder to conduct how they use Ylang Ylang tree and hopefully have one of them demonstrate how they create oil using the Ylang Ylang Tree (Lolo in Samoan)

**Art:** Students draw the plant and paint it using paint and brushes. Teach students about primary and secondary colors and how to use the brush. Have students create a drawing using leaf pressing then use the glue to highlight the veins of the leaves and then use oil pastel to color the leaf. Then create a ylang ylang tree on a bulletin board and use the leaves to decorate it.

**PE:** Invite an elder to come in and demonstrate to students how they would play the olden games called “fiti” using the ylang ylang branches.

**Science:** Fragrant flowers attract pollinators. The ripe blue berries are fleshy and have a sweet smell to attract birds and bats that help to disperse seeds. People usually don’t plant the trees.

**Health:** Talk to students about how older people use ylang ylang tree for medicine and share with them how other country use it and their precaution.
SCREWPINE FAMILY (*Pandanaceae*): Fala/fasa, Asofiafia Manumalo

<table>
<thead>
<tr>
<th>Samoan Name:</th>
<th>Laufala-Laupaogo</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Name:</td>
<td>Pandanus Tree or Screw Pine</td>
</tr>
<tr>
<td>Scientific Family:</td>
<td><em>Pandanaceae</em></td>
</tr>
<tr>
<td>Genus Species:</td>
<td><em>Pandanus utilis</em>, <em>P. amaryllifolius</em>, <em>P. tectorius</em>, <em>P. pygmaeus</em>, <em>P. veitchii</em>.</td>
</tr>
</tbody>
</table>

**HISTORY**

The origin of *P. utilis* has traditionally been thought to be Madagascar, but more recently the Mascarene Islands have been suggested as a possible place of origin. A long history of cultivation and transport to many parts of the world makes the origin difficult to trace. First described by a French naturalist Jean Baptiste Bory de Saint-Vincent. Although they were given a common name of pine, they are monocots. Their name is derived from the spiral arrangement of their leaves around the branches.

**STORY**

There was an elderly lady who lived with her son. The old lady loved to weave different kinds of handicrafts using dry pandanus leaves and fruits. She used long parts of pandanus roots for her walking stick because she was limping. She sell weaving baskets, flowers, fans, fine-mats, and
leis (ulafala). This was how she made money to support her and her son. One day the boy went off-Island to finish school and the old lady was all alone by herself at home. Days go by and the old lady was very tired that she couldn't work anymore. She was so hungry but she was to weak to stand up and prepare food for herself.

But luckily, she has neighbors who lived right next to her. A girl passed by and saw the old lady trying to stand up. She quickly called the lady's name and asked if she needed help. And the old lady said, “Yes, please can you give me some food. I am too tired and weak to cook”. So the girl rushed back to her house, grabbed some food and gave to the lady. The old lady was so happy and thanked her for the food. After she finished eating, the old lady gave the girl a beautiful Flower (Sei) she made from pandanus leaves. She told her that the flower is a symbol of “Love and Beauty” that will remind her about the love that she had shown upon her. The girl smiled and put the flower on her ear and headed back home.

The next day, the old lady was very thirsty, but too tired to walk. A handsome boy passed by and saw the old lady trying to stand up. So he called her name and asks if she need help. The old lady said, “Yes, please can you get me a cup of water”. The boy went to his house and gets some water and the old lady was so happy and drank the whole cup of water. After she finished drinking, the old lady say thanks and gave him a Lei (Ulafala) that she made from dry pandanus fruit. She told him that the Lei (Ulafala) is a symbol of “A Good Leader” that will remind him of who and what will he become in the near future. The handsome boy laughed and say goodbye to the lady. The old lady was getting very older.

Then one Sunday morning, a Deacon came to the old lady's house to visit her, because this is what they do every Sunday before the church begin. The Deacon knocked on the door three times, but nobody came. So the Deacon called out the old lady's name, and the old lady answered with a shaky voice. By the sound of her voice, the Deacon knew right away that something is happening to the old lady. So he opened the door and walked inside and found the old lady lying on the ground with tears in her eyes. The Deacon asked her if she needs help. The old lady said, “yes please, I'm very sick”. I want to go to the hospital”. So the Deacon picked her up and carried her to the car and quickly took her to the hospital. The old lady was hospitalized for three days.

When she came back home, the old lady went to see the Deacon to thank him and gave him a big Fine-Mat (Ietoga), that she wove and saved under her bed. She told him that the fine-mat is a symbol of “honesty and bravery”, to remind him of God's greatest gifts to all man, to obtain Eternal life. The Deacon accepted the old lady's gift with a smile. So the old lady went back home and she lived happily ever after.

The End

Cultural Uses

• It has been used for erosion control due to its numerous aerial roots. (Roots help bind the sand dunes along the coast from eroding water and wind)
• The leaves are used in different cultures for thatching and production of numerous materials. (Ropes, baskets, hats, place mats, nets, thatched roofs for homes and even paper)
• The fruits form a starchy food and can be eaten after being cooked.
• Used to flavor drinks and desserts.
• Used in religious worship (India)
• The leaves are used to make hair ornaments worn for their fragrance as well as decorative purpose in western India.
• Used for medication.

**PRECAUTIONS**
• The leaves’ edges and the backbone are good and prickly.
• The fruit is not used for food like other countries.

**LESSON TITLE: LAUFALA-LAUPAOGO**
**SUBJECT: MATH AND SCIENCE**
**GRADE LEVEL: ECE**

**Time Span:** 3 hours

**Goals of the Lesson:**
• Design and conduct simple investigations to answer questions or to test their ideas about the environment.

**Objectives:**
• Children will be able to describe parts of the plant and their uses.
• Children will be able to identify and count numbers in sequence order.

**Assessment Task:**
• Ask questions about different parts of the plant.
• How can we use parts of the plant?
• What is important about this plant?

**Prior Knowledge:**
• Children will gain comprehension about the use and the background of the plant.

**Instructional Procedure:**
(a) Make the picture using a numbered sequence.
(b) Draw the picture by connecting numbers in sequence order.
(c) Children draw their pictures by connecting numbers using lines.
(d) Children will explain their drawings to the class and identify the names, colors, shapes, numbers, letters.

**Closure:** At the end of this lesson, we will be singing some songs, and do choral readings about the plants. They will do action movements to demonstrate weaving fine-mats. They will
demonstrate making a flower bouquet using dry pandanus leaves. Children will have an understanding about the important of Pandanus Tree and how it relates to our culture and the way Samoan people lived long ago.

Resources:

Construction papers, scissors, glues, markers, water paint, brushes, tapes, dry pandanus leaves, crayons, bamboo sticks, books, pictures, magazines/newspapers.
1. Names:

<table>
<thead>
<tr>
<th>Samoan</th>
<th>English</th>
<th>Scientific Family</th>
<th>Genus species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laufala</td>
<td>Screwpine</td>
<td>Pandanaceae</td>
<td>Pandanus tectorius</td>
</tr>
<tr>
<td>Lau’ie</td>
<td>Screwpine</td>
<td>Pandanaceae</td>
<td>Pandanus spurius</td>
</tr>
<tr>
<td>Laupaogo</td>
<td>Screwpine</td>
<td>Pandanaceae</td>
<td>Pandanus whitmeeanus</td>
</tr>
</tbody>
</table>

2. Family history:

   a. Screwpine plants were brought or introduced to Samoa by Polynesian voyagers.
   b. Prior to European influence, ALL Samoan clothing was made from plants.

3. Story of Laufala:

   Long ago, in Fitiuta, Manu’a Islands lived a couple, Mata and Fesagai, and their daughter Futa. One day, using the dried pandanus leaves, Futa begins to weave her fine mat. This fine mat would eventually be considered the first fine mat of Samoa. Daily, Futa weaved. Futa’s skills had improved so much that it was easily seen by the size and beauty of her mat. Once, when Futa was weaving, a stranger pays her a visit. The stranger, Tagaloaalagi, is immediately stricken with love and makes his feelings known to Futa. Annoyed by the stranger’s gesture, Futa quickly collects her mat and personal belongings and leaves home. Determined to get away from Tagaloaalagi, Futa jumps into the ocean and swims to the island of Tutuila.

   When Futa arrives at the village of Matatula, she decides to settle and continue her craft. In time, Futa meets and then marries Fealoalo of the village of Utumea. Soon their union produces a daughter named Maofa. Eventually Futa passes her skill to Maofa. After weav
for many years and being of old age, Futa passes the completed fine mat to her daughter. Maofa keeps the fine mat safe and begins to decorate it by adding bird feathers from local birds such as the segavao. The mat-weaving skills that were passed from mother to daughter continued as Maofa transfers to her daughter, Sinaletulauta, the skills and knowledge of weaving and importantly Futa’s fine mat. The tradition of passing the skills and the family heirloom to the female line of Futa continued from one generation to another until it reached Tuitoga.

Tuitoga was known for her beauty and the fine mat she kept with her. Lautivugia, brother of the King of Tonga (Tuitoga), hears of this and decides to kidnap Tuitolo and two of her family members. He takes them to Tonga. Forced to live in Tonga, Tuitolo strikes the fancy of the Tuitoga. Suddenly, Lautivugia mysteriously disappears and is presumed dead. Tuitolo’s family members somehow knew what happened but are silent. It was possible the Tuitoga had something to do with his brother’s death because of his desire to marry Tuitolo. Nevertheless, thinking that the Samoans were the cause of his brother’s death, the King of Tonga puts forth the order to have Tuitolo and her family burned at the stake. As the preparations are underway for the bonfire, Tuitolo reaches for her family heirloom-mat and uses it to cover her and her relatives. They bow before Tuitoga and plead for their lives. Wanting to find the cause of his brother’s disappearance, the Tuitoga pauses the execution. Instead, he plans to get help from a matai, high chief, in Samoa.

And so Tuitoga sails with Tuitolo and her relatives to Samoa. They arrive at the village of Falefa. High Chief Leuteleiite alongside of the village river expresses, ‘It’s easy to know the sound of water by footsteps of visitors’ - *E le tauilo vaifolau*. Sure enough Leuteleiite meets with Tuitoga and a few words are exchanged. With Tuitolo and her family safe in Samoa, Leuteleiite finally reveals to Tuitoga, who was ready to depart Samoa, where to find the body of Lautivugia.

Futa’s mat played a significant role in protecting Tuitolo and her family members from execution. Thus the fine mat became known as, ‘Cover of Life’ (*Pulou O le Ola*), and ‘One equals a Thousand’ (*Tasi ae afe*). These are the names of the fine mats of many matais or high chiefs of Tutuila. For example, High Chief Gaoteote of Vatia’s fine mat is called *Pulou O le Ola*. In retrospect, the fine mat of High Chief Lealaisalanoa of Tula, (Matatula), the village where Futa arrived with her fine mat, is called *Fala o Futa* (Futa’s mat).

4. **Cultural uses past, present, future potential:**

The ‘ie toga is a fine mat that has gone through a lengthy process of preparation and weaving. From the pandanus tree to the final product, some fine mats can take up to months if not years, depending on the quality and design of the mat, to complete. The Samoan women weave the fine mats that will eventually become a part of the Samoan community. Many Samoan women have moved away from weaving fine mats. In fact, there are only a few who continue the tradition of fine mat weaving.
In a fa’alavelave or special occasion, such as funerals, weddings, birthdays, and bestowal of chiefly titles, fine mats are used as a symbol of alofa and prestige. The ‘ie toga is also another traditional wear for the taupou.

The ‘ie toga is made from the leaves of the pandanus tree, from the Screwpine family. In preparation of collecting the raw materials to weave the ‘ie toga, the pandanus trees are sought. One example of a pandanus tree is the laufala. The laufala leaves, which have grown to a desired length, are cut from the tree and are laid out in the sun to dry. After a few days of drying, the leaves are then rolled into a bundle and then secured using plant fiber. The bundles are then placed in a large pot of boiling water, in which soap or detergent is added, to bleach the leaves. After boiling, the bundles are removed and the leaves placed out to dry in the sun, after which the dry leaves will be collected and rolled into a bundle and secured. When it is time to weave, the leaves are sliced into smaller strips and the midrib is removed. The thin strips are used to weave the ‘ie toga.

In the past, the bundles of lau’ie, another type of pandanus tree, were baked in the umu. After baking, the leaves were separated from the bundle and then individually rolled around the hands, clockwise and then counter-clockwise, to straighten them. The center, or midrib, is removed by cutting the leaf lengthwise down, splitting the leaf in two. For finer mats, the leaves were peeled into two layers to reveal an outer-coarse layer and a shiny layer. The shiny layers were then secured to a string of braided strips of pandanus leaves and then soaked in the tide pools to bleach the leaves. After soaking in the ocean to remove the color or bleach, the leaves are then rinsed in fresh water and laid out in the sun to dry. Once dried, the leaves were rolled into a bundle and then set aside for weaving. Prior to weaving, the leaves would be taken out of the bundle and sliced into strips of similar width. These strips would then be used to weave the fine mat.

The fine mat is a piece of Samoan heritage. The mat weaving craft deserves attention and continuity in order to preserve an important part of the fa’aSamoa. Learn to weave and protect the pandanus trees.

The various style and uses of the different pandanus leaves emphasize the importance of the fine mats to the Samoan culture. In fact, for the completed mats, there were special names given to the fine mats of Samoan chiefs. The legend of Futa explains the origin of the fine mat and the name, “Pulou O le Ola,” or “Cover of Life.” Although there may be other versions of the origins of the fine mat, the following is the story of Futa in American Samoa.

5. **Precautions:** Some pandanus plants have sharp edges or spines on the leaves. Handling the plant may cause skin irritation. Use caution when handling.
LESSON (LESSON TITLE): FINE MATS – ‘IE TOGA

MATĀ’UPU (Subject): Science
VASEGA ‘AMATA (Grade): 9-12
TIME SPAN: 5 days (includes field trips)

GOALS OF THE LESSON:
The goal is for students to understand the significance of the pandanus plants in the Samoan culture and how it is important to maintain this species of plant to ensure this part of the culture does not fade as a result of human influences.

1. MATĀTI’A MA ĀLĀFUA (ASDOE CONTENT STANDARD(S)):
   MATĀTI’A (Strand): Life Science
   ĀLĀFUA (Standard): Biology 1 & 2
   Benchmark (La’asaga):
   BIO 1.8.3: Investigate effects of human activities on the environment
   BIO 2.8.1: Investigate the interdependent relationships in ecosystems
   ĀLĀFUA LAUTELE (Common Core Standards)

2. SINI FA’AMOEMOEINA/TANU’UGA AUTŪ (Objectives):
   o Identify the significance of a local plant (pandanus tree) to the Samoan culture

3. SU’ESU’EGA (Assessment Task):
   o Questions & Rubric provided

4. VA’AI GA LAUTELE (Overview)/FA’AILOA LE ILOA (Prior Knowledge):
   o Teacher will ask the students the following questions.
     o Does anyone know what a pandanus tree is? What about a laufala, lau’ie or laupaogo?
     o Does anyone know of a person who weaves fine mats also known as ‘ie toga?
   o Teacher plays YouTube video for students.
     o [https://www.youtube.com/watch?v=yRKNQrx5woQ - Laitalie and fine mat weaving in Samoa.]
   o Questions to ask the students. Why do women weave mats? (Answers may vary. Men dealt with the plantation and fishing. Women stayed home and dealt with the household and weaved mats.) How long does it take for the lady Laitalie to weave a mat?
After the video, students are given the “Weave your mat” printout. Have students cut out patterns. Students can work in pairs. Students should try to attempt to weave their mats.

Teacher passes out Pandanus Tree Frayer model. Students will be filling out information as the lesson progresses.

5. **FA’ASOLOGA O A’OA’OGA (Instructional Procedures)**

a. **GAIO’IGA TATA’I (Focusing Event):**
   - Students will learn how to take inventory of pandanus trees. Teacher displays photos of local pandanus trees [http://memory.hawaii.edu/page/Pandanus_tectorius](http://memory.hawaii.edu/page/Pandanus_tectorius)

b. **DAY 1 & 2 - Tree Inventory**
   - Establishing duties: Groups should have each of the following.
     - **1) Recorder** – will write down the information relayed to him/her from group members, observe and ensure counts are correct.
     - **2) Data collector** – specifically works on counting species in the area and relays information to the recorder.
     - **3) Communicator** – only person to communicate with the teacher if there are any questions or problems for the activity, also works as a data collector
     - **4) Technologist** – illustrate or takes photos/videos of the study area, also works as a data collector

c. **FA’ATA’ITA’IGA FAIĀ’OGA (Teacher Model): (I Do)**
   - Teacher demonstrates to students how to record the number of species using the Data Table worksheet.
     - Look for pandanus trees. Record height and condition of the tree and the area it is growing. Any shade? Direct sunlight? Branches look ill?
   - What if there are NO pandanus trees? Have the groups select a particular tree in an area to count.

d. **FA’ATA’ITA’IGA/FA’ATINOGA FA’ATASI (Guided Practice): (We do)**
   - Pass out ‘DATA TABLE worksheets, 1 per group.
   - PRACTICE data collection on/off campus, preferably in an area with a lot of trees.
   - Begin collecting data.
   - **Class discussion:**
     - **What are some environmental factors that may have influenced these species growth?** (Answers may vary: lots of sun, poor soil, natural disasters)
     - **What do you think would happen if a specific plant were to increase in numbers?** (Answer: the population will grow but will eventually slow down because there will be a lack of resources and the lack of food, space, and there would be an increase in diseases.)
     - **Carrying capacity**? If an environment cannot support a large population, species begin to decrease in numbers, some eventually dying. What happens if an invasive species grew in the area? (Invasive species such as the tamaligi tree may affect how the pandanus trees will grow)
Do you think humans may have had an effect on the growth of the plant species you counted? How and why do you think that?

**DAY 3 & 4 - Map & Count Pandanus trees – GROUP PROJECT**

- **Mapping:** Teacher shows students Google earth, Google map of Tutuila.
  - Students will be mapping pandanus trees of the nearest area – Lyon’s Park or Industrial Park, OR extend to villages
  - Students place dots on their maps to indicate location of the pandanus/other trees (*Teacher can mention to students that GPS also known as geographic positioning systems are often used to pinpoint the actual location*)
  - Map of the area should be printed for groups to select an area to work in. (*see example of map*)

- **Counting:** *Students will only be counting the pandanus trees*
  
  Each group receives copies of ‘**DATA TABLE**’ and ‘**TREE INVENTORY worksheets**’.
  - Observe characteristics of the area the plant is located
  - Collect data!

- **Things for groups to do:**
  - Research pandanus trees (*characteristics, scientific name, etc.*)
  - Groups will **CREATE A BROCHURE** to communicate data and present it to the class. (**See rubric**).

- **Class discussion**
  - Were you able to find any pandanus trees?
  - What do you think is contributing to the lack/abundance of the pandanus trees in the area that you studied?
  - What are some issues of the habitat or area in which the pandanus trees were growing?
  - What are some strategies that will help prevent these issues from occurring?

**FA’ATINOAGA TA’ITO’ATASI (Independent Practice): (You do)**

- Students will be given the task to map a village that was not mapped in the group project. They may choose to map other native plants.
- Students will investigate human impacts on the environment particular in the areas that were counted.
- Students are to share their findings within their group.
- Teacher will select a few brochures to present to the class.

**FA’AI’UGA (Closure)**

- **FIELD TRIP** to Pola Island/Sauma Trail with the National Park Service and/OR have students watch . . .
6. MEAFAITINO (Resources/Materials, References):

Computer, Internet access to YouTube and Google Maps
Scissors

- NPS (National Park Service) Educational video on Samoan culture, fine mats.
- Images taken at Vaitogi village by Adelle Posala Talaeai
- Pandanus trees and shrubs (identifying pandanus trees) http://www.fao.org/docrep/010/ai387e/AI387E08.htm
- http://nativeplants.hawaii.edu/plant/view/Pandanus_tectorius

7. ACTIVITY HANDOUTS & WORKSHEETS:

1. Tree Inventory & Biodiversity Questions
2. Data table for species count
3. Map of Study Sites
4. Frayer Model
5. Weave your mat
6. Pandanus brochure rubric
ACTIVITY 1. PANDANUS TREE INVENTORY & BIODIVERSITY

1. What is the total number of trees counted?

2. Where did you conduct your inventory? *(Be specific of the location)*

3. Biodiversity:
   a. What were the biological interactions that you saw in the area you counted?

   b. What are some environmental factors that may affect the population growth of the pandanus trees?

   c. How can humans affect the way these species survive in this environment? What are some strategies that can minimize negative effects to the environment?

   d. What can be done to promote the Samoan culture through the use of local plants?
### ACTIVITY 2. DATA TABLE – COLLECT DATA

<table>
<thead>
<tr>
<th>Pandanus Trees Species (Name/illustration)</th>
<th>Description/Characteristics (e.g.: height, condition)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Example:</strong> Pandanus #1 (laufala)</td>
<td>10 ft tall, broken branches</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Pandanus Trees Species (Name/illustration)</th>
<th>Description/Characteristics (e.g.: height, condition)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ACTIVITY 3. MAP OF STUDY SITES
ACTIVITY 4. FRAYER MODEL

**Names - Scientific/Common:**

**Description:**

**Cultural uses:**

**Image:**

**Habitat:**

Pandanus Tree
Activity 5. Weave Your Mat
### ACTIVITY 6. CREATE A PANDANUS BROCHURE RUBRIC

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphics/Pictures</td>
<td>Graphics go well with the text and there is a good mix of text and graphics.</td>
<td>Graphics go well with the text, but there are so many that they distract from the text.</td>
<td>Graphics go well with the text, but there are too few and the brochure seems &quot;text-heavy&quot;.</td>
<td>Graphics do not go with the accompanying text or appear to be randomly chosen.</td>
</tr>
<tr>
<td>Knowledge Gained</td>
<td>All students in the group can accurately answer all questions related to facts in the brochure and to technical processes used to create the brochure.</td>
<td>All students in the group can accurately answer most questions related to facts in the brochure and to technical processes used to create the brochure.</td>
<td>Most students in the group can accurately answer most questions related to facts in the brochure and to technical processes used to create the brochure.</td>
<td>Several students in the group appear to have little knowledge about the facts or technical processes used in the brochure.</td>
</tr>
<tr>
<td>Content - Accuracy</td>
<td>All facts in the brochure are accurate.</td>
<td>99-90% of the facts in the brochure are accurate.</td>
<td>89-80% of the facts in the brochure are accurate.</td>
<td>Fewer than 80% of the facts in the brochure are accurate.</td>
</tr>
<tr>
<td>Writing - Grammar</td>
<td>There are no grammatical mistakes in the brochure.</td>
<td>There are no grammatical mistakes in the brochure after feedback from an adult.</td>
<td>There are 1-2 grammatical mistakes in the brochure even after feedback from an adult.</td>
<td>There are several grammatical mistakes in the brochure even after feedback from an adult.</td>
</tr>
</tbody>
</table>

Acknowledgement: This lesson is a collaboration with the National Park of American Samoa.
LESSON PLAN 1.1 WEATHER AND CLIMATE

Description of Student/Academic Class:
This is an elementary 4th grade class in American Samoa consisting of 25-30 students.

Overview

We hear about weather and climate all of the time. Most of us check the local weather forecast to plan our days. There is, however, still a lot of confusion over the difference between the two. Weather is what you see outside on any particular day. So, for example, it may be 90° degrees and sunny or it could be 78° degrees with cool trade winds. That’s the weather. Climate is the average of that weather. For example, in American Samoa you can expect the hot and wet season from November to April or the cool and dry season from May to October. This is climate. The climate record also includes extreme values such as record high temperatures or record amounts of rainfall. (NOAA, 2014)

Skill Focuses/Objectives: Climate vs. Weather

- To help students distinguish between climate and weather, in order to strengthen their abilities in communicating about the two.

By the end of this task students are expected to be:
- Able to identify at least three types of weather.
- Able to identify at least three types of climate.
- Able to know the difference between weather and climate.

American Samoa Education Curriculum Standards Addressed:

ASDOE Elementary Science Standard 6: Students assesses the interrelated cycles and forces that shape Earth’s surfaces, including human interaction with Earth. (ASDOE Elementary Science Standards: Grade 4)
**Benchmark 4.6.2:** Explore how limited supplies of natural resources affect human activity and how human activities affect the environment.

**Benchmark 4.6.3:** Investigate causes and effects of natural changes to Earth’s surface.

**Pre-task: (5 minutes)**
Show the students the Rainbow photo. Describe the purpose of the entire curriculum as a journey for learning concerning the impact of climate change on American Samoa and the world. The rainbow is a biblical sign over American Samoa; it is a covenant or promise involving mankind, God and the environment. We take care of the environment and the environment takes care of us. We need to do our part which includes planting trees, walking instead of driving, exercising, not using Styrofoam/plastic products. Discuss the rainbow—combination of rain, sun, and wind. Explain the significance of the colors—Blue (marine), Green (rainforest), Yellow (climate), Red (climate change), Orange (climate change effects), Indigo (voyaging), and Violet (Solutions). Each color will have a lesson/unit. Let us be a part of the solution!

![Rainbow Image]

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**Task #1: (10 minutes)**
1. Take the class outside and discuss how Mt. Pioa (Rainmaker) got its name.
2. Provide each student with a copy of the Tutuila Island rainfall map.
3. Discuss why the central part of Tutuila Island rains a lot. (The proximity between the two tallest mountains—Mt. Matafao and Mt. Pioa causes a lot of rain. Explain how weather is influenced by these mountains).
4. Introduce and explain the importance of the Equator and how it influences the climate in American Samoa (e.g., tropical climate).
Map 1: Tutuila Island Rainfall Map

Figure 1: Equator and the Samoan Islands

Task #2: (15 minutes)

Weather or Climate: This activity focuses on determining the students’ knowledge about weather and climate covered in the pre-activity. Divide the class into groups of two. The teacher will show the power point presentation that contains pictures of the different types of weather or climate. The teacher will then read each slide out loud (photo facing the students, but the statement and answer will be visible only to the teacher) while the students decide whether the picture represents weather or climate.
Materials: Computer, projector, screen. Connect to the internet so that the students can see other weather and climate conditions in other areas of the world.

Examples of Weather Conditions:
North Wind----Toelau
South Wind---Toga
West Wind---La’i
East Wind---Mataupolu
Northwest Wind---La’i Toelau
Northeast Wind---Vaitoelau
Southwest Wind---La’i Toga
Southeast Wind---Tuaoloa

Examples of Climate Conditions:
Vaipalolo---Season for harvesting palolo
(Nov-Jan)
Tropical
Hot and Wet
Cool and Dry

Computer/Projector Examples: See the Weather vs. Climate power point presentation

Front:

Back:

It is a beautiful sunny day.

(Asswer: Weather)

Post-task: (10 minutes)
Gather the students together and play the Rainy Day song. Wrap-up the lesson by teaching them the lyrics of this song.

“Rainy Day” Song
Timu, timu alu ese
Timu, timu alu ese
O matou nei e mana’o i le ta’alo
Timu, timu alu ese.

Rain, rain go away
come again another day
Little Tavi wants to play
Rain, rain go away
COMMENTS/SUGGESTIONS/CHANGE:

1. What went well?
2. What did not go well?
3. What new ideas do you have as a result of teaching this lesson?
4. What will change?
5. How was your volume?
6. Speed of talking?
7. Ability to explain content?
8. Ability to issue instructions to tasks?

LESSON PLAN 1.2 CLIMATE CHANGE

Description of Student/Academic Class:
This is an elementary 4th grade class in American Samoa consisting of 25-30 students.

Overview

Climate change is a long-term shift in the statistics of the weather (including its averages). For example, it could show up as a change in climate normal (expected average values for temperature and precipitation) for a given place and time of year, from one decade to the next. Climate change is a normal part of the Earth’s natural variability, which is related to interactions among the atmosphere, ocean, and land, as well as changes in the amount of solar radiation reaching the Earth. We know that the global climate is currently changing. The last decade of the 20th Century and the beginning of the 21st have been the warmest period in the entire global instrumental temperature record, starting in the mid-19th century. (NOAA-NWS, 2007)

Skill Focuses/Objectives: Climate Change
• To help students understand the concept of “climate change.”

By the end of this task students are expected to be:
• Able to define and explain the significance of “climate change.”
• Able to identify at least three examples of climate change in the world and the Pacific region.

American Samoa Education Curriculum Standards Addressed:

ASDOE Elementary Science Standard 6: Students assesses the interrelated cycles and forces that shape Earth’s surfaces, including human interaction with Earth. (ASDOE Elementary Science Standards: Grade 4)

Benchmark 4.6.2: Explore how limited supplies of natural resources affect human activity and how human activities affect the environment.
Benchmark 4.6.3: Investigate causes and effects of natural changes to Earth’s surface.

Pre-task: (10 minutes)
Show the students the “What is Climate Change?” video and introduce the concept of climate change and how it is affecting the world especially the Pacific region.

Task: (25 minutes)

Can You Tell the Difference: This activity allows students to study and analyze three sets of photos. Each set will consist of a “before” and “after” shot of the same place and gauge their ability to identify climate change events happening around the world over time. One photo will depict what the place looked like ten years ago compared to a recent photo. Students will be asked to determine what, if any, changes they observe from the two photos.

Materials: Climate Change Before and After handout, pencils, pen.

Post-task: (10 minutes)
Discuss what the students learned from the presentations. Gather the students together and play the Earth Day music video. Wrap-up the lesson by teaching them the lyrics of this song. This song embodies the value of our planet Earth to mankind.

Earth Day Song
What about sunrise What have we done to the world
What about rain Look what we’ve done
What about all the things What about all the peace
That you said we were to gain... That you pledge your only son...
What about killing fields What about flowering fields
Is there a time Is there a time
What about all the things What about all the dreams
That you said was yours and mine... That you said was yours and mine...
Did you ever stop to notice Did you ever stop to notice
All the blood we’ve shed before All the children dead from war
Did you ever stop to notice Did you ever stop to notice
The crying Earth the weeping shores? The crying Earth the weeping shores
Aaaaaaaaah Oooooooooh Aaaaaaaaah Oooooooooh
Aaaaaaaaah Oooooooooh Aaaaaaaaah Oooooooooh
CLIMATE CHANGE, BEFORE AND AFTER
Below: California Bridge, drought ([https://plus.google.com/117481886678557294658](https://plus.google.com/117481886678557294658))
COMMENTS/SUGGESTIONS/CHANGE:

1. What went well?
2. What did not go well?
3. What new ideas do you have as a result of teaching this lesson?
4. What will change?
5. How was your volume?
6. Speed of talking,
7. Ability to explain content,
8. Ability to issue instructions to tasks?

LESSON PLAN 1.3 CAUSES OF CLIMATE CHANGE

Description of Student/Academic Class:
This is an elementary 4th grade class in American Samoa consisting of 25-30 students.

Overview

Over the last century the burning of fossil fuels like coal and oil has increased the concentration of atmospheric carbon dioxide (CO$_2$). This happens because the coal or oil burning process combines carbon with oxygen in the air to make CO$_2$. To a lesser extent, the clearing of land for agriculture, industry, and other human activities have increased concentrations of greenhouse gases. Most climate scientists agree the main cause of the current global warming trend is human expansion of the "greenhouse effect"—warming that result when the atmosphere traps heat radiating from Earth toward space. (NASA, 2016)

Skill Focuses/Objectives: Causes of Climate Change

- Students will understand and recognize how certain activities contribute to the rise of climate change.

By the end of this task students are expected to be:

- Able to identify at least three human activities that causes climate change.

American Samoa Education Curriculum Standards Addressed:

ASDOE Elementary Science Standard 6: Students assesses the interrelated cycles and forces that shape Earth’s surfaces, including human interaction with Earth. (ASDOE Elementary Science Standards: Grade 4)

Benchmark 4.6.2: Explore how limited supplies of natural resources affect human activity and how human activities affect the environment.
Benchmark 4.6.3: Investigate causes and effects of natural changes to Earth’s surface.

Pre-task: (10 minutes)
Show the Causes of Climate Change power point presentation to the students to introduce the factors that cause climate change. Which of these causes do you see every day? Which one of these causes is more damaging to our planet? Who and what are at risk?

Task: (25 minutes)

Group work: The class will be divided into groups of four (Air, Water, Forest, Coral Reef). Each group will be given a poster board. Students will work together as a group to create a poster that displays the causes of climate change on one of the four components (Air, Water, Forest, and Coral Reef) in American Samoa. (20 minutes group work; 10 minutes will be used to share their results)

Materials: Costumes, Music player, posters, paper, pen/pencils. Video camera, projector, computer, and digital camera will be provided by the teacher.

Post-task: (10 minutes)
Gather the students and play the Heal the World music video and teach them the lyrics. This song embodies mankind’s attempts to heal the wrongs of the past with regards to climate change.

Song: Heal the World
There's a place in your heart
And I know that it is love
And this place could be much
Brighter than tomorrow
And if you really try
You'll find there's no need to cry
In this place you'll feel
There's no hurt or sorrow

There are ways to get there
If you care enough for the living
Make a little space
Make a better place

Heal the world
Make it a better place
For you and for me
And the entire human race
There are people dying
If you care enough for the living
Make it a better place
For you and for me

If you want to know why
There's love that cannot lie
Love is strong
It only cares of joyful giving
If we try we shall see
In this bliss we cannot feel
Fear of dread
We stop existing and start living

The it feels that always
Love's enough for us growing
So make a better world
Make a better place

 Heal the world
Make it a better place
For you and for me
And the entire human race
There are people dying
If you care enough for the living
Make a better place for you and for me
And the dream we were conceived in
Will reveal a joyful face
And the world we once believed in
Will shine again in grace
Then why do we keep strangling life
Wound this earth, crucify its soul
Though it's plain to see
This world is heavenly
Be god's glow

We could fly so high
Let our spirits never die
In my heart I feel you are all my brothers
Create a world with no fear
Together we cry happy tears
See the nations turn their swords into
plowshares

We could really get there
If you cared enough for the living
Make a little space
To make a better place

Heal the world
Make it a better place
For you and for me
And the entire human race
There are people dying
If you care enough for the living
Make a better place for you and for me

Heal the world
Make it a better place
For you and for me
And the entire human race
There are people dying
If you care enough for the living
Make a better place for you and for me

There are people dying
If you care enough for the living

COMMENTS/SUGGESTIONS/CHANGE:

1. What went well?
2. What did not go well?
3. What new ideas do you have as a result of teaching this lesson?
4. What will change?
5. How was your volume?
6. Speed of talking,
7. Ability to explain content,
8. Ability to issue instructions to tasks?

LESSON PLAN 1.4 GREENHOUSE GASES AND CLIMATE CHANGE

Description of Student/Academic Class:
This is an elementary 4th grade class in American Samoa consisting of 25-30 students.
Overview
If it were not for greenhouse gases trapping heat in the atmosphere, the Earth would be a very cold place. Greenhouse gases keep the Earth warm through a process called the greenhouse effect. The Earth gets energy from the sun in the form of sunlight. The Earth's surface absorbs some of this energy and heats up. That's why the surface of a road can feel hot even after the sun has gone down—because it has absorbed a lot of energy from the sun. The Earth cools down by giving off a different form of energy, called infrared radiation. But before all this radiation can escape to outer space, greenhouse gases in the atmosphere absorb some of it, which makes the atmosphere warmer. As the atmosphere gets warmer, it makes the Earth's surface warmer, too. (EPA, 2016)

Skill Focuses/Objectives: Causes of Climate Change
- Students will understand and recognize the role of the greenhouse gas effect on climate change.

By the end of this task students are expected to be:
- Able to define and understand the role of carbon in the greenhouse gas effect.
- Able to understand how carbon emissions contribute to climate change.

American Samoa Education Curriculum Standards Addressed:

ASDOE Elementary Science Standard 6: Students assesses the interrelated cycles and forces that shape Earth’s surfaces, including human interaction with Earth. (ASDOE Elementary Science Standards: Grade 4)

Benchmark 4.6.2: Explore how limited supplies of natural resources affect human activity and how human activities affect the environment.

Benchmark 4.6.3: Investigate causes and effects of natural changes to Earth’s surface.

Pre-task: (5 minutes)
Show the Greenhouse Effect video that introduces students to the concept of greenhouse gas effect and its role in our planet. How does it contribute to climate change?

Task: (35 minutes)

Group work: Divide the class into groups of four. Have the groups work on creating their own gas emission using the instructions and materials provided. Instructions will be made available through the NOAA Activity booklet (pages 22-23). After everyone has completed their handout, the students will be asked to write down their observations and results.

Materials: NOAA Activity Booklet, Pen, Pencils. The park may provide materials for the experiment to the schools as the national park effort to promote the community awareness about the Greenhouse Effect.

Post-task: (5 minutes)
Conduct a class discussion to review what the greenhouse gas effect is and does to planet Earth. 

What is the role of carbon?

COMMENTS/SUGGESTIONS/CHANGE:

1. What went well?
2. What did not go well?
3. What new ideas do you have as a result of teaching this lesson?
4. What will change?
5. How was your volume?
6. Speed of talking,
7. Ability to explain content,
8. Ability to issue instructions to tasks?

LESSON PLAN 1.5 HUMAN CAUSES OF CLIMATE CHANGE

Description of Student/Academic Class:
This is an elementary 4th grade class in American Samoa. This class consists of 25 students from completely diverse cultural settings.

Overview
Over the last century the burning of fossil fuels like coal and oil has increased the concentration of atmospheric carbon dioxide (CO₂). This happens because the coal or oil burning process combines carbon with oxygen in the air to make CO₂. To a lesser extent, the clearing of land for agriculture, industry, and other human activities have increased concentrations of greenhouse gases. Most climate scientists agree the main cause of the current global warming trend is human expansion of the "greenhouse effect"—warming that result when the atmosphere traps heat radiating from Earth toward space. (NASA, 2016)

Skill Focuses/Objectives: Causes of Climate Change
- Students will understand and recognize how certain activities contribute to climate change in American Samoa.

By the end of this task students are expected to be:
- Able to identify at least three local causes of climate change in American Samoa.

American Samoa Education Curriculum Standards Addressed:

ASDOE Elementary Science Standard 6: Students assesses the interrelated cycles and forces that shape Earth’s surfaces, including human interaction with Earth. (ASDOE Elementary Science Standards: Grade 4)
Benchmark 4.6.2: Explore how limited supplies of natural resources affect human activity and how human activities affect the environment.

Benchmark 4.6.3: Investigate causes and effects of natural changes to Earth’s surface.

Pre-task: (10 minutes)
Ask the students to help list daily activities on the board that they engage in that contributes to climate change. Responses may include cutting down trees, not carpooling, leaving the light on during the day, leaving the water running while brushing their teeth, etc. All the responses will be recorded on the board and reviewed for accuracy and detail.

Task: (20 minutes)

Group work: Divide the class into four groups. Instruct each group to compose a localized 60 second Public Service Announcement (PSA) in Samoan and English that describes what climate change is and what causes it. Two groups will compose a radio PSA, while the other two groups compose a TV PSA. The groups should reflect on the different causes of climate change and select which one works best for them. The students are encouraged to develop catchy and meaningful PSA’s that will catch the attention of their respective audiences. The groups conducting TV PSA’s can wear costumes and create props, while the groups composing radio PSA’s should carefully write a script. Conduct a dry-run before performing, the students will also vote for their favorite radio and TV PSA. The best radio and TV PSA’s will be taped with all the students and then posted via the National Park of American Samoa’s Youtube and Facebook pages. Sample PSA texts are provided below:

| Please don’t cut down the forest because __________________________. |
| In the forest there are trees and animals that make their home in our forest. |

| Ride your bicycle to school or walk with your friends to the store. Please drive less because __________________________. |
| Burning fossil fuels is bad for you, me and our environment. |


Post-task: (10 minutes)
Discuss with the class what they learned from the different PSA’s. Which one did they like the best? Why? What messages were evident through the PSA’s? Afterwards, gather the students together and play the Samoa e Lou Atunu’u Pele music video. Wrap-up the lesson by teaching them the lyrics of this song.

Song: Samoa e Lou Atunu’u Pele
Samoa e lo’u atunu’u pele i le loto e e mitamita lo’u agaga ia te oe
O ou vaitafe lemu ma le sami e i’ila pe a suluia maia le masina

O atumauga fa’asolosolo
E lafoia lona paoloi vaifuloto ae ou folaulau ai ma ou lagilagi pese ma ou fa’a’alogo i le tausani o manu lele

Samoa e, ou te alofa tele ia te oe
E mitamita lo’u agaga ia te oe

Tiga na ou malaga i atunu’u o Papalagi ae le galo mai Samoa ma ona masani
E maua lua talo ma fa’i, ulu ma ufi ma palusami ma fa’i sina i’a e ina’i ai
O tagata uma e fealofani e alolofa lua i so’o se tasi
E leitioa molimaui mai le tasi tusitala
O Samoa o le Penina o lenei vasa

Samoa e, ou te alofa tele ia te oe
E mitamita lo’u agaga ia te oe

COMMENTS/SUGGESTIONS/CHANGE:

1. What went well?
2. What did not go well?
3. What new ideas do you have as a result of teaching this lesson?
4. What will change?
5. How was your volume?
6. Speed of talking,
7. Ability to explain content,
8. Ability to issue instructions to tasks?
CLOSING COMMENTS:

We hope you enjoy reading the stories, looking at the pictures, learning about the animals, plants and the weather and climate of American Samoa as much as we enjoyed researching, writing, and sharing them. We are proud to have accomplished the writing and sharing of lessons, participating in field trips, and meeting and learning from community partners from NOAA, ASPA, ASCC, ASDOE, and especially National Park of American Samoa in our four week 2015 summer session. The book was updated in 2017 with lessons contributed by Adelle Talaeai, Tearina G Asiata and Tavita Togia with support from National Park of American Samoa and an award from Dr. Chinn.

We hope you find the lessons useful for your students and that they inspire you to learn, teach about, and take care of the treasures that are in our own backyards.

In the photos below, Mrs. Migo shares some photos taken by a Zoomy, an electronic microscope technology shared in class.

Mrs. Migo: “I was amazed and surprised when I used the Zoomy to see the leaves of the papaya plant. It was interesting about the sprouts that are growing from the top of the leaf of the papaya.

The photo below is the caterpillar that was in the plastic bag that you passed around for us to look at. I was also amazed how colorful the caterpillar is.

Pauline Chinn: Striking colors, patterns, and the fake spines seen below are often a warning the animal tastes bad or is poisonous. This tiny Monarch butterfly caterpillar was less than half an inch long, but the Zoomy magnified it 43 times. Can you tell if this is the head or tail end? It’s the tail end. The head end has 6 true legs and jaws to eat leaves of the crown flower plant. See https://www.math.auckland.ac.nz/~hafner/monarch/71.24x.jpg.

Thank you very much, Dr. Chinn for the Zoomy. I will have my students use it to see plants/animals or anything that the eye cannot see.