

# ‘OHE KĀPALA

BY DANE FUJIWARA

What value does ancestral knowledge hold in the modern classroom?

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ELEMENTARY SIXTH GRADE

TIMEFRAME THREE SESSIONS

## STANDARD BENCHMARKS AND VALUES

### **CCSS.MATH.CONTENT.6.G.A.1**

Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

### **CCSS.MATH.CONTENT.7.G.A.2**

Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given

conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

### **KS WEO**

Ke Ao Ho’oulu – Growth

Ke Ao Imi Na’auao – Knowledge and wisdom

**ENDURING UNDERSTANDING**

Hawaiians with a sense of identity living in a modern society.

**OUTCOME**

- Students can solve real world equations using variables.
- Students can draw geometric shapes.
- Students have a sense of identity of who they are as Hawaiians.

**ASSESSMENT:**

- Formative: Homework, progress checks with 'ohe kāpala
- Summative: Mini quiz, description of 'ohe kāpala.
- Authentic Assessment: Printed costume for Hō'ike

**PRE-ASSESSMENT:**

- Mathletics<sup>1</sup> Geometry solving for area activity will be given before the first lesson as pre-assessment.

# LEARNING PLAN

**LESSON ONE: INTRO AND GEOMETRIC SHAPES****ASSESSMENT:**

Formative: Homework – Where do I come from? design  
Self-teach TINKERCAD program.

Summative: Mini quiz

**MATERIALS AND RESOURCES**

Student's supplies

- Intro Activity: Nature walk to identify geometric shapes in nature. Class will take a walk around the MS campus and sketch the geometric shapes in relation to the things in nature that the students may notice.
- Discuss: The students in table groups discuss what they found and their thinking behind their ideas.
- After the discussion students will use graph paper to graph the shapes that they previously sketched.
- Instruction: Students will learn how to solve for area of geometric shapes using formulas for area. Students will also learn translations and transformations of geometric shapes. They will practice solving for area, translations and transformations with the shapes that they started with in the intro activity.
- I will display examples of kāpala materials and discuss with class how do you think that ancient Hawaiians achieved this type of products. Why was this pattern chosen?
- Homework: Research things about their ahupua'a and design a pattern that is representative of where the student comes from only using geometric shapes with transformations. Write a descriptive piece on the meaning of the design.
- Closure - Reflective question: Why are all designs going to be similar yet different?
- Mini Quiz: Explain the process on how to solve for area of design.

<sup>1</sup> Mathletics is an online software that gives students practice lessons and assessments on various topics.



## LESSON TWO: MINI QUIZ AND 'OHE DESIGN

**ASSESSMENT:**

Formative: Homework – Begin working with 'ohe kāpala

Summative: Mini quiz

**MATERIALS AND RESOURCES**

Student's supplies

'Ohe blanks

- Students take out their designs and homework.
- Display Mini Quiz question. Calculate the area of the positive space and explain the process and formulas used.
- Students complete the Mini Quiz.
- After the students complete the mini quiz they are to read the information on 'ohe kāpala.
- Hand out grid paper.
- The students will create a design with the program TINKERCAD so that it may be printed to be used to kāpala costume for the spring concert. The boys will choose either Kamehameha or Kauikeaouli and the girls will choose either Ka'ahumanu or Nāhi'ena'ena. The students will create design that has a connection or is a representation of the ali'i. The grid paper can be used as a starting point and a guide as they are working on the 3D printable file.
- **NOTE USING TINKERCAD:** I tell the students to learn how to use the program on their own. There are tutorials that they can look at.
- **Dimensions:** I use inches and the snap grid is  $\frac{1}{16}$ ". The height of the base of the kāpala only needs to be  $\frac{1}{8}$ " and the positive space another  $\frac{1}{8}$ ". The other dimensions – approximately 7" x 1.5"
- The file needs to be completed in class because the printing does take some time even if the prints are relatively small.
- **Homework:** Continue working on their explanations of their areas and finish up their TINKERCAD files ASAP.
- **Closure:** Reminder about homework.

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<b>Mathematical Knowledge</b>	Demonstrates a complete understanding of geometric figures and mathematical concepts used to solve the problem.	Demonstrates adequate understanding of geometric figures and mathematical concepts used to solve the problem.	Demonstrates little understanding of mathematical concepts used to solve the problem.
<b>Accuracy</b>	Calculations and work are thoroughly shown, completely accurate, highly organized and clear.	Calculations show a systematic approach, work is organized with little errors.	No systematic approach and work is unclear and disorganized.
<b>Explanation &amp; Communication</b>	Explanation and reasoning very clear, and thinking process easy to follow.	Explanation and reasoning is clear, thinking process easy to follow.	Little explanation and reasoning, difficult to follow.

## ‘OHE KĀPALA (BAMBOO STAMP)

In Peter Buck's book, *Arts and Crafts of Hawaii*, "Clothing", the author catalogued an enormous collection of native 'ohe kāpala or bamboo stamps. The designs are many and varied, predominantly straight line geometrics with the occasional leaf or round shape. The fine craftsmanship is evident in the delicate intricacy of these stamps. Some were even repaired when they had cracked from use. A few had carved parts made of tortoise shell and were painstakingly tied onto the bamboo handle. Some designs have meanings that are interpretations of the things that Hawaiians were accustomed to seeing in day-to-day life such as the feathers of a bird, the bones of a fish, and the teeth of a shark and variations of those themes.

### TRADITIONAL HAWAIIAN DESIGNS

Looking at these images, each horizontal row representing an individual stamp design, it's apparent that the craftsmen of that time had no problem spinning a simple variation of a shape in endless ways. People often ask me if there are meanings to all the designs. While there are interpretations of some of the hundreds of known stamps, much of that information has been lost to us now.



From <http://www.kapahawaii.com/hawaiian-kapa-designs-and-patterns.html>



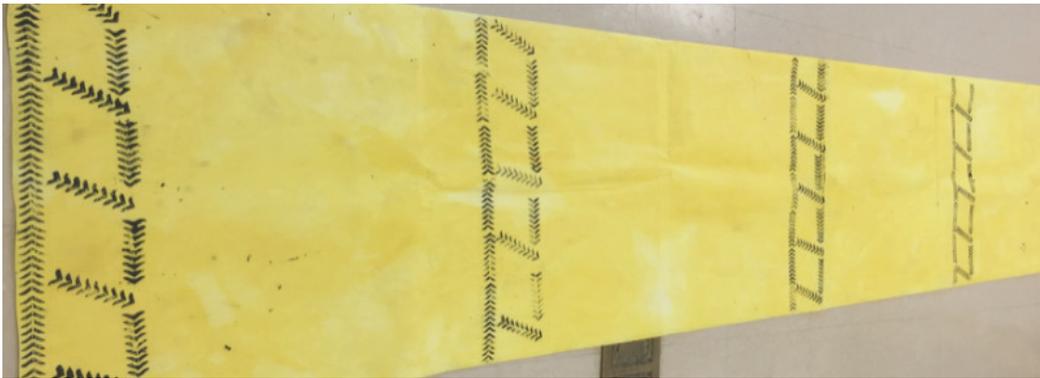
**LESSON THREE: AUTHENTIC ASSESSMENT (PRINTING)****ASSESSMENT:**

Summative: Printed Pelion

**MATERIALS AND RESOURCES**Acrylic Paint  
3D Prints  
Paintbrushes  
Pelion

This will be a working class period. After the 3D prints are complete the students will be printing on the pelion in order to create a cultural design representing the alifī they have chosen. I will demonstrate how to apply paint on to the kāpala and how to stamp the design. The students will be allowed to create their own design with the kāpala. The goal is to complete as many prints as possible.

*SIDE NOTE: This can get messy. Be prepared with cleaning supplies. The plastic doesn't soak up paint like bamboo normally would.*



Finished pāū

**GRADING:** The mathematical concepts were previously graded. This portion would be graded as complete/incomplete.

**HOMEWORK:** If the students would like to design their reflective design in TINKERCAD to be printed this is an option.

**CLOSURE:** Reflection answering question: What value does ancestral knowledge hold in the modern classroom?

NAME \_\_\_\_\_ DATE \_\_\_\_\_

# WHERE DO YOU COME FROM?

**INSTRUCTIONS:** Using today's lesson combined with research of **YOUR OWN** ahupua'a, design a pattern with geometric shapes that show translations and transformations. Be sure to use the grid paper to plot the vertices of your design.

- 1) What ahupua'a are you from?
- 2) Plot your design on attached grid paper.
- 3) Explain the meaning of your design.