KUNG FU PRACTICE ON HŌKULEʻA

BY LISA UYEHARA

How many crew members can practice kung-fu on the waʻa at the same time?

MIDDLE SCHOOL SEVENTH GRADE

TIMEFRAME THREE CLASS PERIODS / 45 MIN. EACH

MATHEMATICS COMMON CORE STANDARDS:

In Grade 7, instructional time should focus on four critical areas: (1) developing understanding of and applying proportional relationships; (2) developing understanding of operations with rational numbers and working with expressions and linear equations; (3) solving problems involving scale drawings and informal geometric constructions, and working with two- and three-dimensional shapes to solve problems involving area, surface area, and volume; and (4) drawing inferences about populations based on samples. For purposes of this lesson, students will focus on (1) and (3) of the Mathematics Common Core Standards.

RATIOS AND PROPORTIONAL RELATIONSHIPS
- Analyze proportional relationships and use them to solve real-world and mathematical problems.

GEOMETRY
- Draw, construct and describe geometrical figures and describe the relationships between them.
- Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

NĀ HONUA MAULI OLA PATHWAY:
ʻIKE OLA PONO:
Incorporating healthy living habits includes exercise and a balanced lifestyle.

MATHEMATICAL PRACTICES AND GENERAL LEARNER OUTCOMES:
1. Make sense of the problems and preserve in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.
KUNG FU HISTORY

The ancient Chinese believed the ideal world works in yin-yang or “balance” between all things including nature, relationships, and within the human body. The importance of yin-yang in the Shaolin temple, where monks spent most of their days meditating gave rise to practicing kung fu for physical health benefits. Kung Fu translates as “hard work” from Chinese to English.

Many of Chinese Kung Fu customs are taken from everyday life. Historically, was taught strictly from father to son and this where the term “Sifu” or “Teacher-Father” originated. Like many other cultures, the values of family and respect are very important in Chinese culture and the philosophy and practice of Kung Fu reflects those values. Other titles used in the kwoon (school) are Sigung, Sidai, and Sijay – translated as grandfather, older brother, and older sister. Sigung is the highest rank in a kung fu school, and Sidai and Sijay refers to a student that outranks others within the kwoon.

The kwoon is the place where the student learns all of the methodological, ideological, and philosophical aspects of Kung Fu. Chinese Kung Fu is a powerful fighting art, but the original purpose of spreading Kung Fu was to unite people. In Chinese philosophy, fighting is considered the lowest form of compromise, so traditional Kung Fu schools teach that fighting is always the last resort in any situation. The kwoon is considered a cherished place of learning, where students learn to develop themselves to the highest order of excellence, to be a person of virtue and confidence, clear mindedness, and a person of character. Respect for life and how to preserve it, as well as how to live it, is at the center of Kung Fu instruction, Order of Shaolin Ch’an, “The Shaolin Grandmasters’ Text: History, Philosophy, and Gung Fu of Shaolin Ch’an,” 2006; Wong Kiew Kit, “The Art of Shaolin Kung Fu,” 2002.

KWOON PROTOCOL

Every student must bow as they walk in the door of the kwoon. Students line up according to rank in straight lines with formal uniforms, and neatly dressed before class starts. The most senior ranking student leads the other students in “paying respect” to the Sifu, instructors, the Grand Masters (deceased masters) and Living Masters by bowing to their pictures above the altar or on the walls of the kwoon.

(Photo by Kanu Hawai’i)
Every student bows as they walk through the door of the kwoon, exit the door of the kwoon, and at the formal beginning and end of class. The right hand is in a closed fist as the left hand is open. Both hands are touching each other at chest level with feet together. The bow is performed by bending at the hips. Some kung fu styles, such as Shaolin Kung Fu, also add the tiger crane bow after all the other formal bows are done to signify the beginning and end of class.

**WHY PRACTICE KUNG FU ON THE WA‘A?**

Kung Fu does not require equipment beyond one’s body. Kung Fu integrates cardio, strength, and flexibility training. Kung Fu also has a meditative quality because of its demand for controlled breathing. Therefore, because of its overall workout benefits and convenience because no equipment is necessary, it is an ideal exercise.

**WHY IS THE KNOWLEDGE OF MATHEMATICS IMPORTANT ON THE HŌKULE‘A?**

One of many reasons: In order for the Hōkūle‘a crew to stay healthy (mind and body) during the World Wide Voyage, the crew must have adequate sleep, food, water, and exercise. The crew must maintain their health while being away at sea in a small space. It is your task to help the crew by solving problems involving a scale drawing and geometric constructions. You must do this with two and three-dimensional shapes to solve the problem of how many people can train in Kung Fu during a single exercise session.

**THE HŌKULE‘A**

Named after the star Arcturus that passes directly over the Big Island, Hōkūle‘a means the “Star of Gladness” in Hawaiian. The canoe has logged more than 150,000 miles in 11 long-distance voyages, plus six statewide sails and numerous training voyages.

**SPECIFICATIONS OF THE HŌKULE‘A**

- **DISPLACEMENT:** 12.5 tons fully loaded
- **DRAFT:** 2 feet, 6 inches
- **WEIGHT:** 7 tons
- **CARRYING CAPACITY:** 5.5 tons
- **COST:** About $125,000 originally
- **Mast height:** 31 feet
- **BEAM:** 20 feet
- **LENGTH:** 62 feet
- **SLEEPING COMPARTMENTS:** Five boards are placed across the hull access panels where provisions are stored.
- **KAPALINA:** Canvas covers provide shelter for the sleeping compartments.
- **SPEEDS:** 4 to 6 knots (5 to 7 mph) while reaching 15 to 25 knot (17 to 29 mph) tradewinds.
Assumptions: It takes 8 and ½ feet in width and 11 and ½ feet in length for a single person to be able to practice Lau Gar Kuen. The Kung Fu form (Lau Gar Kuen) moves in horizontal and vertical directions as well as diagonally.

EXERCISE #1:

In a small group, tape off an area that would mirror the space on the waʻa and work out the steps of the form. Further assume that no one except the Master Navigator knows how to do the Lau Gar Kuen form. The Master Navigator is an expert in kung fu.

1. Find the complete area it would take to complete the Lau Gar Kuen form.

2. Knowing that 2 people can perform the entire set in the 8 and ½ by 11 and ½ feet space (the “box”), how many “boxes” can you have on the Hōkūleʻa and how many people can practice at the same time?
EXERCISE #2:
Now assume that the entire crew knows the form very well after an entire year of practicing while on the wa'a and at a kung fu school. Try and do the form as a larger group without falling off the wa'a.
1. Find the complete area it would take to complete the Lau Gar Kuen form.

2. Knowing that 2 people can perform the entire set in the 8 and ½ by 11 and ½ feet space (the “box”), how many “boxes” can you have on the Hōkūle'a and how many people can practice at the same time?

EXERCISE #3:
Describe the differences between exercise 1 and exercise 2. What were the differences (if any) and what were the factors that changed your answer (if it did) between exercise 1 and exercise 2?

By solving the geometry problem above, you will be able to help keep the crew healthy, and gain the critical skill of solving problems utilizing scale drawings and informal geometric constructions. You will gain the skill of working with two and three-dimensional shapes to solve problems involving area and surface area.

<table>
<thead>
<tr>
<th>STANDARD BENCHMARKS, OR NĀ HONUA MAULI OLA</th>
<th>SKILLS</th>
<th>CONCEPTS</th>
<th>ASSESSMENT</th>
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</thead>
<tbody>
<tr>
<td>Ratios and proportional relationships</td>
<td>Make observations</td>
<td>Generating and analyzing geometrical space and volume.</td>
<td>Completing an activity marking the specifications of the Hōkūle'a and practicing movement within that confined space.</td>
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<tr>
<td>Operations and geometric relationships.</td>
<td>Recognize limitations and possibility in proportional relationships &amp; geometry.</td>
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<td>Generate and analyze relationships between proportion and geometry in finite space.</td>
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<tr>
<td>'ike Ola Pono: Wellness Pathway –</td>
<td>Connect spiritual practices with physical exercise for a healthy lifestyle.</td>
<td>Understanding that mind and body is connected.</td>
<td>Student understands the connection between mind and body.</td>
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<tr>
<td>Caring for the wellbeing of the spirit, na‘au and body through culturally respectful ways that strengthen one’s mauli and build responsibility for healthy lifestyles.</td>
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<td>Student understands the value of a healthy lifestyle.</td>
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