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Lessons from *The Little Crooked House*

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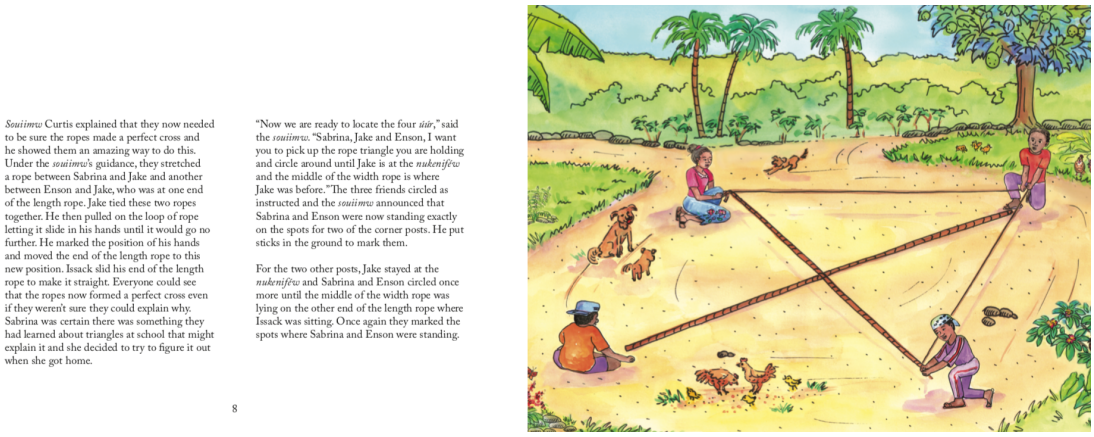
Abstract. This is an overview of the lessons associated with the book *The Little Crooked House* (Lee, 2015). The original lessons in indigenous mathematics can be found in the paper, *A culturally based mathematics unit for grade seven students on Chuuk State*, submitted to the University of Hawai'i at Manoa in the context of the author's Master's program. Full lesson resources are available from Pacific Resources for Education and Learning.

1. Introduction

There are major problems with the teaching of mathematics in Chuuk:

- the current approach to teaching and learning of mathematics in the classroom is inappropriate and not meaningful,
- the 'western' (sometimes called 'main land') approach to the teaching of mathematics adversely affects students' perceptions of the value of their own culture, and consequently produces mathematics knowledge that is not useful nor beneficial to the needs and practice of the Chuukese people's indigenous ways of working and interacting, and
- the transition to the learning of classroom mathematics, because of its explicit exclusions of culture, has very little effect on students' success in the learning of mathematics.

These problems are addressed by a set of nine lessons associated with *The Little Crooked House* book (see Figure 1 for an example from the storybook, Lee, 2015).


Souiimw Curtis explained that they now needed to be sure the ropes made a perfect cross and he showed them an amazing way to do this. Under the *souiimw's* guidance, they stretched a rope between Sabrina and Jake and another between Enson and Jake, who was at one end of the length rope. Jake tied these two ropes together. He then pulled on the loop of rope letting it slide in his hands until it would go no further. He marked the position of his hands and moved the end of the length rope to this new position. Issack slid his end of the length rope to make it straight. Everyone could see that the ropes now formed a perfect cross even if they weren't sure they could explain why. Sabrina was certain there was something they had learned about triangles at school that might explain it and she decided to try to figure it out when she got home.

"Now we are ready to locate the four *iúr*," said the *souiimw*. "Sabrina, Jake and Enson, I want you to pick up the rope triangle you are holding and circle around until Jake is at the *nukeniféw* and the middle of the width rope is where Jake was before." The three friends circled as instructed and the *souiimw* announced that Sabrina and Enson were now standing exactly on the spots for two of the corner posts. He put sticks in the ground to mark them.

For the two other posts, Jake stayed at the *nukeniféw* and Sabrina and Enson circled once more until the middle of the width rope was lying on the other end of the length rope where Issack was sitting. Once again they marked the spots where Sabrina and Enson were standing.

8

FIGURE 1. Example from *The Little Crooked House*, pp.8-9.

The lessons follow the successive stages in the building of a traditional Chuukese house as portrayed in the storybook. Each lesson is culturally authentic as it presents a stage in the house construction and the mathematics embedded in each stage.

2. Timing of the Lessons

The lessons cover a significant number of the grade seven standards and benchmarks for mathematics. The lessons can be distributed throughout the year as a particular set of topics is addressed or as an introduction to certain topics. Alternatively, they can be grouped together towards the end of the school year as a way of reviewing and pulling together the year's work. Lessons vary in length but tend to require about 2 hours of class time. Each lesson is divided into Activities for which the estimated time is given. Rarely do these activities exceed 45 minutes. This allows teachers to adapt lessons to the schedule for mathematics in their schools.

3. Lesson Structure

Each lesson starts with a list of the objectives. Where appropriate, the Chuuk benchmarks are indicated. To read these benchmarks, note that the middle number indicates the grade level. For example, MAT. 4.7.1, indicates a benchmark from Standard 4 (Patterns and Algebra) for Grade 7, and the 1 indicates the first benchmark for this standard: "Find the expression for the general term in a growing pattern and use it to find the general term in the pattern."

A list of materials required for the activities in the lesson to be fully implemented follows. Teachers need to prepare these materials beforehand. A few materials that are used in every lesson are listed in the early lessons but then assumed to be there. These materials are the copies of the storybook and the heavy paper and markers necessary to make the word wall cards.

The important vocabulary in each lesson is given under the title "Word Wall." Each word found there should be clearly printed on cardstock 11 inches by 2 to 3 inches (cutting a letter size sheet into 3 or 4 cards). These cards are prepared ahead of time and posted, as they arise in the lesson, on the Word Wall (an area on the board or a clear wall where the cards are visible to all students) using tape or poster putty. A Glossary at the end of the book offers definitions of the English words. The Chuukese words are presented in a glossary at the end of the storybook.

Classroom activities follow and within each activity a number of experiences are described. Resources related to these experiences can be found at the end of each lesson. Although most resources are for the teacher, some are worksheets for students. When this is the case, the resource number is indicated in the materials section so the needed number of copies can be prepared ahead of time.

Scattered throughout the activities are "Questions" which are generally not specific questions for the students but overarching questions that guide the inquiry. They can be copied on the board as they arise and addressed from time to time as the work progresses.

Every lesson closes with a brief plenary session. This either pulls together some aspects of the lesson or anticipates the next lesson, or both.

4. Chuukese Vocabulary

Although the lessons and related storybook are in English, the Chuukese words related to the building of a house and those used in measurements (for which there is no English equivalent) are introduced. See Figure 2 for an example. It is important to recognize the variations in these words, and in their written form, from one region to the next. The Chuukese measurement system is primarily gestural, not written. However, a book of lessons has no choice but to offer a written form. This is why each resource dealing with units of measure contains photos of the gesture involved. In the classroom, the accent should be on the gestures, not the written words.

❖ Resource 1f: Chuukese length measures

Unit of measurement	Number indicators	Description
NGAAF	1. engaf 2. ruengaf 3. ununga f 4. fengaf (fangaf)	Distance between thumb tips on outstretched arms
ETINEUPW	This unit is not normally used independently so no number indicators are given.	Distance from thumb tip on outstretched arm to the center of the chest

Relationship: etineupw + etineupw = engaf

FIGURE 2. Snapshot of Lesson 1 for grade 7 with Chuukese length measure gestures and words.

5. Resources

See the MACIMISE website for the Grade 7 Lessons:
https://macimise.prel.org/wp-content/uploads/2015/06/Chuukese-House-Building-Supplemental-Lessons-and-Resources-for-The-Little-Crooked-House.-Grade-7.-Lee-Nokar.pdf