Teaching Mathematics Using African Cultural Numerical History

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INTRODUCTION

Lee High School serves a large geographic area in Houston and is a Title I school, which means more than 95% of our students qualify for free lunch. Many of our students are recent immigrants and have limited English language skills. The student body is quite diverse, demonstrated by the fact that our students speak over forty different languages. The school is administratively divided into six learning communities, and it also operates an English Language Institute, in which I teach. I myself am a first generation immigrant from India and am privileged to be teaching Mathematics to 9th graders in the English Language Institute of Lee High School ("HISD School Profiles").

The English Language Institute serves beginning and preliterate students who are learning English as a second language. The students assigned to the program are first generation newcomers, representing a new immigrant community as it is integrating and learning to become part of the mainstream school and America. Our Institute works to provide English language instruction while at the same time exposing these students to the rigors of content knowledge. Approximately 20 percent of our students at the Institute are from the African continent. The majority of the remaining 80 percent of the students are Spanish speaking from South and Central America and Mexico ("Lee High School Home Page").

At our Institute, the students are learning a new mathematical language in addition to English. The Algebra and Pre-Algebra Benchmark Program at Lee High School enables students to show mastery of small goals by giving them multiple opportunities to accomplish them. The English Language Institute has a Pre-Algebra Program, the objective of which is directed at providing introductory arithmetic number skills so that the students can perform well and stand up to the rigors of a regular Algebra program. I teach both the Pre-Algebra and the Algebra Benchmark Program at the Institute.

RATIONALE

My participation in the seminar, *African History: Ancient Times to the Atlantic Slave Trade Era,* was motivated by an intense desire to learn about the rich cultural heritage of the students I teach in order to better address their emotional and educational needs. Many of these students have come from war-torn regions and have suffered severe emotional distresses that still haunt them. They come from Chad, Somalia, Sudan, Republic of Congo, and Burundi.

Students from Africa are very diverse in their various nationalities and local customs and speak several different languages. They come with varied math abilities and some have little or no math skills. Students may or may not have been to school. They may have had an interrupted education. Other students have attended school and have acquired some formal education. One of the many challenges in working with my African immigrant students is communication since they do not all speak the same language. They also have to master the decimal number system and learn the associated number names and math vocabulary very distinct from their own, unlike my Spanish speaking students. Students who speak Spanish help each other with translations.

Moreover, African students are immersed into an English Language program that is largely focused on a student population of Hispanic origin who speak a common language. Students from the African Sub-Sahara form a minority and have the added challenge of earning respect from a large body of Spanish speaking students. This environment presents cross-cultural learning opportunities to be explored within the classroom setting. During the seminar I learned about the technological sophistication accomplished on the African continent as early as 1500 CE. Hence, the curriculum unit will draw on the rich cultural heritage of Sub-Sahara Africa. The unit will aim to impress students with the technological developments and enable the students to be aware of African peoples' contributions to global culture.

One of my goals in undertaking the study of African cultures and writing this unit was to understand education techniques in Sub-Saharan Africa. I wanted to uncover indigenous methods of teaching mathematics in Africa and use it in my classrooms. Mathematics is often thought of as a culture-free subject. Academic researchers and ethnographers are uncovering local Mathematics in the African context and presenting it to the wider educational world. The curriculum unit I have developed presents aspects of indigenous African mathematic systems that have been discovered recently by ethnographers. The goal of the unit is to provide a cross-cultural learning environment for both student populations in my class room (Hispanic and African), whereby African students can feel pride in the rich mathematical tradition found on the continent, and the Hispanic students might come to develop a deeper appreciation for African cultures as well.

OBJECTIVES

The unit presents the fascinating world of indigenous African mathematical systems as discovered by ethnographers. In addition, it aims to explore and help assess the technological achievements and global contributions of Sub-Saharan Africa. The unit goal is to create an organic bridge to Western ways of doing math. The students will:

- Explore some historical developments such as iron-making, expansion of trade and commerce and its impact on the African mathematical system
- Assess the need for standardization of numbers, weights and measure
- Compare and contrast the modern decimal number systems with number systems in the African cultural contexts
- Identify, compare and create gestures to represent numbers
- Compare and contrast an African algorithm for multiplication using the concept of the double with conventional algorithm of multiplication using carrying
- Discover and develop patterns and use them to predict and solve problems

UNIT BACKGROUND

In the unit background we will look at the educational system in Sub-Saharan Africa and how it impacts student learning. We also will look at examples of how math was historically used and applied in a number of African cultures.

Understanding Education in Sub-Saharan Africa

According to Urch, there is a scarcity of literature written in the English language concerning educational development in Sub-Saharan Africa (79). He identifies five themes around which the issues of the African educational systems can be understood (2). These are the African heritage, the colonial heritage, multiple languages, education for self-reliance or technological advancement, and education for nation building.

It is important for anyone teaching African students to understand these issues. For example, countries on the African continent have varied colonial legacies and as such have inherited a

colonial educational system. The schools are patterned after French, Portuguese, or British Educational systems. Colonial education, as instituted by missionaries and supported by colonial government, aimed to provide literary education for indoctrination purposes or to prepare for a job in a western styled economy (Urch 3). Due to colonial rule, western style education was adopted and maintained in most nations even though a need was recognized to reintroduce a cultural component that emphasized African heritage.

As pertaining to math education in Sub-Saharan Africa Jaji and Jaji identify five key issues. Similar issues exist in the American educational context and teachers of math will be able to identify with African issues. These are language, gender, technology, teacher training education, and problems related to classroom teaching (139). In most African cultures, students speak or are exposed to a multiplicity of languages, which has been seen as a source of problems for true advancement in any discipline. In many places French and English are languages of instruction along with an African language, which is valued as an important means of appreciating ones own culture and history. However, mathematics is often taught through the medium of a foreign language, oftentimes one that is not well-mastered (Jaji and Jaji 143). Furthermore, curricula established by the colonial education system remains in force: testing dominates the curriculum, determines who can continue to secondary level, and forces teachers to abandon attempts to teach higher-level thinking (Jaji and Jaji 141).

Another problem is that during the colonial times, access to education was far from equal. Education was for the privileged few, so after independence there was a push for universal primary education. Enrollment increased, creating a high demand for teachers. The quality of teaching declined as a result of the need to "mass produce" teachers (Jaji and Jaji 139). Training periods were often shortened in order to quickly create at least partially trained teachers. Since the 1980s economic downturn and lack of resources has further deteriorated the quality of education.

With this background in mind, we will proceed to look at some aspects of the indigenous math as uncovered by ethnomathematicians. Ethnomathematics is a study of mathematical ideas in the context of a given culture. It is gaining respect and coming to be seen as an essential component to teaching mathematics. This unit will draw on math systems that predated the modern schooling and represent more *African* ways of making sense of the world using culturally specific algorithms when performing the basic math operations of counting, calculating and estimating. Claudia Zaslavsky's children's book entitled *Count on Your Fingers African Style* offers an important contribution on numbers and associated gestures in some African cultures. In her book *Africa Counts* she surveys the social mathematics of the region and provides invaluable examples of cultural math that teachers can explore with their students. Much research is being pioneered and many publications are being produced, not least of which are from well known ethnomathematicians such as Paulus Gerdes and Ron Eglash. Both of them have done extensive research and published pioneering works. Many examples of indigenous African math can be found in Gerdes' book on *Geometry from Africa* and Eglash's work on *African Fractals.*

Numbers and Number Names in African Cultures

In English the use of the word *number* refers to a set of symbols and names associated with each symbol; these in turn form the number system. In African number systems, standardized gestures accompany or replace number names. African societies were primarily oral societies and consequently do not have written records. They had indigenous names for numbers, but they tended to be changed through inventions of new names or borrowing of foreign terms as the growth of trade and economy led to the expansion the number system (Zaslavsky, *Africa Counts* 36). An example can be found with the influence of the Arabic with the spread of Islam by the 11th century and its impact on the Hausa language of Northern Nigeria. The number word for six

is *shida* (from Arabic *settah*); twenty is *ashirin* (from Arabic *eshreen*); thirty is *talatin* (from Arabic *thalatheen*) (Zaslavsky, *Africa Counts* 45).

In English, we use the Hindu-Arabic numeral symbols that are distinct and ten in number, starting with the digit 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. The decimal place value system in conjunction with the four arithmetic operations of addition, subtraction, multiplication and division, allows us to express values and compute combination of numbers. It is the place value that explains 3 digits written together as 326 to mean 3x100 + 2x10 + 6. Our math system has a base of 10 and is called the decimal system since each place is 10 times the value to its right. For example 1000 is 10 times 100.

According to Zaslavsky, English words referring to numbers contain old ideas of counting so that the number *three* has been thought to mean *beyond many or more than one can count* (*Africa Counts* 34). Some number words show a direct relationship such as *three* and *third*, but *one* and *first* and *two* and *second* show no relationship. This allows Zaslavsky to conclude that the number words *one* and *two* pre-date the invention of the counting sequence. The number word *eleven* means *one left* and *twelve* means *two left*. These specifically refer to the additional fingers needed to count *eleven* and *twelve*, by having used all 10 fingers. The word for *thirteen* is derived from *three plus ten* and *fourteen* means *four plus ten*.

Generally African number words identify the operations: for example, *four and four* to mean the number *eight* (Zaslavsky, *Africa Counts* 37). Many African number systems use five as their base for their number system, along with a secondary base of ten or twenty. When five is the base, the number name for *six* is the *sum of five and one*; *seven* is the *sum of five and two*; *eight* is the *sum of five and three*; and *nine* is the *sum of five and four*. When twenty is used as the base as is the case in the Igbo numeration, number words for thirty is *ohu na iri* which literally means *twenty and ten*. Number word for *fifty* is *ohu na iri na otu* which means *twenty times two and ten*. In the Nigerian Yoruba number system, which also has twenty as its base, the number word for *fourty six* is *twenty in three ways less ten less four*: 46 = 20 x 3 –10 – 4 (Zaslavsky, *Africa Counts* 43).

Counting words for *one*, *two*, and *three* have survived from the earliest African language times and new words are added or adopted. Despite the vast region with diverse cultures and languages, the words for *two*, *three*, and *four* are very similar in the region inhabited by the Bantu-speaking people, a region which comprises nearly half the continent. Approximately 300 Bantoid languages are spoken in parts of Nigeria, Democratic Republic of Congo, Central African Republic, Uganda, Kenya, Somalia, Zambia, Namibia. *Two* is usually a form of *li* or *di*, the number word for *three* includes the the syllable *ta* or *sa*, and *four* contains the consonant *ne* (Zaslavsky, *Africa Counts* 39).

The Malinke languages of Western Africa provide fascinating examples of how certain African people have conceptualized and developed number names. For example the word for *nine* is *kononto*, which literally means *to the one of the belly*. This makes reference to the nine months of pregnancy. The number word for *fifteen* means *three fists*. The word for *twenty* refers to *a complete man* since twenty conceptualizes the ten fingers and ten toes. The number name for *forty* literally means a *mat*. A mat is where a couple sleeps together, thus referring to the counting of both fingers and toes of the man and woman which equal forty (Zaslavsky, *Africa Counts* 36). The number word for *hundred* means *five complete man*. The Malinke expression for *five complete man* was replaced by the word *keme*, which means a large number (Zaslavsky, *Africa Counts* 43). In the Mende language of Sierra Leone, the number name for *hundred* was *five men finished*. Presently *hondo yila* is used as a number name for *hundred*, *hondo* being borrowed from English *hundred* and *yila*, meaning *one.*

In some African languages words for numbers can be expressed through special hand gestures. The gestures accompanying number words form a formal way of counting. For example, in the Zulu language of South Africa the number word for *six* is *isithipa*, which literally means *take the thumb*, to indicate that all the fingers of one hand have been counted and sixth would be the thumb of the second hand (Zaslavsky, *Count on Your Fingers African Style* 30). In some cultures fingers separated between third and fourth show the number *four* as a sum of *two and two*. Unlike Western cultures, in Africa finger counting usually starts with left hand palm facing up. Counting starts with all fingers bent, and counting to *five* involves extending the little finger followed by the ring finger in that sequence until all fingers are extended. Numbers *six* through *ten* are counted on the right hand in a similar sequence. Fingers are extended in some cultures and bent while counting. In some systems counting starts with the index finger and then moves to the middle finger and so on. In other systems counting starts with the thumb and ends with the little finger (Zaslavsky, *Africa Counts* 47).

Weights and Measures

According to Zaslavsky, local measures abound and standarized measures are an exception in Africa. Traditionally measures were not precise and depended on the need of each individual society on the continent. It was also determined by the capacity of what was being measured and for what purpose. Weights were determined by comparison and feeling two objects at the same time. Merchants had their own systems of measurements. Akan chiefs measured gold dust using their own methods. In the early days of the Portugese arrival in Congo, cowrie shells were being measured in containers holding 40, 100, 250, 400, or 500 shells as opposed to counting (Zaslvasky, *Africa Counts* 86). Items being weighed or measured for taxation purposes, such as honey and grain, were closely monitored, while items weighed for simple exchanges were impresice and depended upon the usefulness and availability of the item.

In general, there were a lot of variations. The degree of standarization depended on the spread of commerce. Some uniformity was established and enforced in 1500 CE by the largest and wealthiest African empire, the Songhai Empire. It had its own inspectors who ensured compliance and enforced the standards for weights and measurements. The Songhai Empire rose to power in late 1400 CE and incorporated the fomer Ghanian and Mali Empire. Songhai was the largest empire in West Africa and is credited to have had its own professional army and navy.

Measurements are approximate and depend on the importance of the item being weighed or measured. Typically, units of length referred to body parts as used by the people of Uganda, called the Ganda (Zaslavsky, *Africa Counts* 88). They have words in their language *mukono* to describe cubit, and other words to describe fathom and span. *Kibo* is a basket holding ten pounds of dry measure, *lubya* is used for weighing salt and indicates a load of thirty or forty pounds, and *lutata* is a bundle of about thirty pounds of sweet potatoes. A *kiribwa* is used for weighing about twenty pounds of coffee beans. Feet were measured by actual pacing during the building of homes using wooden poles. In Ethopia, in addition to cubit, fathom, and span, smaller measures such as thosed based on the thickness of a finger, width of four fingers, and length of a joint were used. Many measures of capacity were based on the human body: *a pinch, a handful, an armful, a mouthful*. Smaller capacities for dry goods were measured in locally produced containers made of clay, wood, skin, horn, basketware or gourd. Larger capacities were measured in terms of the animal body. Loads were measured in terms of *a man's load*, *two men's load,* or *a mule load* (Zaslavsky, *Africa Counts* 91). In Benin, short distances were measured with feet, and long distances, such as distances between towns and villages, were measured in days of the time it took to travel the distance between them, such as lunch or breakfast to lunch.

Thus measures and weight in Africa are similar to those found in the English system. The table of measure presented below is based on the human body and replaced the earlier African systems of measures during the colonial era (1880s-1960s) (Zaslavsky, *Africa Counts* 89).

British Imperial System of Measure

Unit of Measure	Body Parts
Inch	Tip of the thumb to the knuckle of thumb
Cubit	Elbow to the end of the middle finger
Foot	Sixteen fingers
Yard	Tip of the nose to the tip of the middle finger of an outstretched arm
Fathom	Tip to the tip of the fingers of the outstretched arm.
Acre	Amount of land that a pair of oxen could plough in the course of day

For the British, a cubit was about half a yard and was measured from the elbow to the end of the middle finger. It's not clear whose elbow was used, the buyer's or the seller's. There are stories showing that the buyer would bring a friend with long arms to get a better deal. The dealer with the longest arm had more customers. The cubit has now almost disappeared as a unit of measure. With colonization measures of units began to acquire some form of standardization in Africa. Iron rods are used for yard measurements and prominently displayed by shopkeepers.

Concept of the Double and Its Use to Find a Product of Two Numbers: A Brand New Concept to Western Thinking and Traditions

Some African arithmetic uses multiples of two to compute. Doubles are culturally important and significant in many African cultures: twins are especially esteemed, blacksmiths use twin bellows, a double iron hoe is presented during bridal ceremony, and the world is understood as a dual world of spirit and matter. The divination system or fortune telling in African religion such as the *Ifa* divination system uses a base of two. It involves tossing of two shells that are connected by a double chain that land facing open side up or closed side down. Eglash argues that the base-two system has a mathematical significance both in relation to the African fractals and to computing (93). Doubling is also used in modern times as well with hand gestures. Hand gestures indicate doubling when *two groups of two fingers* are used to represent the number *four* and *two groups of four* is used to represent the number *eight*. This idea of doubling was used in multiplication and division techniques.

West African tailors traditionally used the technique of doubling to do large mental multiplications (Eglash 89). It is a complex procedure. The tailors double a factor multiple number of times and match them up with corresponding powers of two. They also use addition and subtraction along with multiplication to find the product of two numbers. Africa had an oral culture and these cultures can boast memories far sharper than ours. It was an oral culture and their memories were stupendous and far better developed.

For example, in order to find the product of ***three*** and ***two hundred thirteen***, start with ***three*** and double it to get *six*, *twelve*, *twenty-four*, and so on. At the same time keep track of the corresponding powers of two each time a number is doubled. The corresponding power of two for *six* is $2^1=2$ the corresponding power of two for *twelve* is $2^2= 4$ and the corresponding power of two for *twenty four* is $2^3 = 8$ and so on. Stop before the power of two reaches a number greater than ***two hundred thirteen***, and make a mental note and memorize the corresponding double of

three, which in our example is *three hundred eighty four*. Doubles (6, 12, 24, 48, 96, 192, **384**,768…) Power of two (2, 4, 8, 16, 32, 64, **128**, 256…)

Subtract *one hundred twenty eight* (power of two) from ***two hundred thirteen*** (213–128 = 85). Start over to double ***three*** and keep track of the corresponding powers of two. Stop before the power of two reaches a number greater than the difference of *eighty-five* and make a mental note and memorize the corresponding double of three, which in our example is *one hundred ninety two*. Doubles (6, 12, 24, 48, 96, **192**, 384,768…) Power of two (2, 4, 8, 16, 32, **64**, 128, 256…)

Subtract *sixty-four* (power two) from the difference of *eighty-five* (85 – 64 = 21). Start over to double ***three*** and keep track of the corresponding powers of two. Stop before the power of two reaches a number greater than the difference of *twenty-one* and make a mental note and memorize the corresponding double of three, which in our example is *forty-eight*. Doubles (6, 12, 24, **48**, 96, 192, 384,768…) Power of two (2, 4, 8, **16**, 32, 64, 128, 256…)

Subtract *sixteen* (power two) from the difference of *twenty-one* (21-16 = 5). Start over to double ***three*** and keep track of the corresponding powers of two. Stop before the power of two reaches a number greater than the difference of *five* and make a mental note and memorize the corresponding double of three, which in our example is *twelve*. Doubles (6, **12**, 24, 48, 96, 192, 384,768…) Power of two (2, **4**, 8, 16, 32, 64, 128, 256…)

Subtract *four* (power two) from the difference of *five* (5 - 4 = 1). Memorize and make a metal note of three, the original factor. The sum all the numbers memorized is the product of the ***three*** and ***two hundred thirteen*** which is six hundred thirty nine. (3+12+48+192+384 = 639). In order to verify the workings of this algorithm, I experimented with many different factors. The algorithm worked each time and after some practice it became easier to find products of two factors. This method works with different factors and is truly amazing.

Summary of Table

Compare Power of 2 with differences	Power of 2 to consider	Corresponding double factor	Difference
128 < ***213***	128	384	213 – 128 = 85
64 < **85**	64	192	85 – 64 = 21
16 < **21**	16	48	21 – 16 = 5
4 < **5**	4	12	5 – 4 = 1>> add 3
		3	
Sum of corresponding double factors		**639 = 3*213**	

OVERVIEW OF THE CURRICULUM UNIT

The unit will be comprised of four lessons. These lessons will be sequential and will be taught throughout the semester as part of the Algebra IA curriculum in the state of Texas. Each lesson will be interspersed at different intervals with the regular curriculum, thus serving as a constant reinforcement of the contributions made by the African peoples.

The first lesson will explore the historical developments of Africa. The second lesson will focus on the number system of the West juxtaposed to the systems found in some African cultures. Number names and accompanying gestures will be explored. The third lesson will explore measures and weights in the African context and the importance of standardization of weights and measures. The fourth lesson will allow students to use the West African tailor's method of finding the product of two numbers using the idea of doubling and the power of two.

LESSON PLANS

Lesson One: Historical Development of Sub-Saharan Africa

This lesson will provide an overview of the region and its accomplishments.

Objectives

Locate specific African regions and countries on a map
Give examples of the diversity of Sub-Saharan Africa
Give example of the technological contribution of Sub-Saharan Africa
Research the cultural history of the different peoples of Africa

Materials

Map of Africa, videos *Wonders of the African World* and *The Tree of Iron*, paper, pencil, flip chart, and markers

Key Concepts

Geographic term and vocabulary
Cultural, economic and linguistic diversity of African people
African Iron Age
Commerical Revolution

Activity One: Identifying Countries in Africa

Using a map, students identify countries in Africa where their classmates came from.

Activity Two: Movie Presentation One

Using the documentary *Wonders of the African World with Henry Louis Gates, Jr.,* students identify examples and artifacts of African cultural, historical diversity.

Activity Three: Movie Presentation Two

Using the documentary *Tree of Iron,* students explain how iron-making shows the technological abilities of the Africans.

Assessment

Students produce a brief research paper on the language, dress, food and an important recent development of the region, then do an oral presentation to the whole class.

Lesson Two: Number Names and Gestures

This lesson will provide an introduction to numbers and number names from a number of African cultures.

Objectives

Compare and contrast the number names from African cultures with those of the US
Appreciate number names and how they are used to name larger numbers
Differentiate between base 5, 10, 20
Perform hand gestures associated with numbers
Identify number names and their correlation to human body parts

Material

Map of Africa, copies of *Count on Your Fingers African Style* by Zaslavsky, paper, pencil, flip chart, and markers

Key Concepts

African number systems and number names
Number names in the decimal system
Concepts of base 5, 10 and 20
Number representation through gestures
Origins of common number names using specific body parts

Activity One: Group Reading

Using cooperative learning groups, students read *Count on Your Fingers African Style*, then practice number names and hand gestures.

Activity Two: Graphic Organizer

Using a chart, students list number names, base of number and hand gestures.

Activity Three: PowerPoint Presentation

Students will view a presentation describing how certain African peoples have conceptualized and developed number names using body parts. Using pictures on PowerPoint, students match number names with body parts.

Assessment

Students in small groups create their own number system with accompanying gestures. They produce a table of numbers and describe the hand gestures that will accompany these names.

Lesson Three: Body Parts and Measurements

This lesson will introduce students to weights measurements as practiced in pre-colonial Africa before standardization by colonial powers.

Objectives

Compare weights in two different measurement standards: Metric vs English
Convert from one standard of measurement to another
Determine the reasonableness of their conversion to make valid conclusions
Discuss the need for standardization of measures

Material

Map of Africa, calculator, paper, pencil, flip chart, and markers

Key Concepts

Standards of measurement commonly used in US, Europe, and Sub-Saharan Africa

Conversion from one standard to another
Reasons for standardization of measures

Activity One: PowerPoint Presentation

Students view a presentation on use of body parts for measurements as practiced in pre-colonial Africa and discuss the reasons for standardization of measurements.

Activity Two: Pair Work

Different pairs of students measure each others' heights using any one of the units of measurement: English, African, Metric. Then students compare results and convert each others' measurements into the standard form. Lesson ends with students writing measuring data in a chart.

Assessment

Students independently find height of other students in class and convert from one unit of measurement to another.

Lesson Four: Product through Doubling and Powers of Two

This lesson will introduce students to finding product of two factors using the concept of doubling and powers of two as used by West African tailors.

Objectives

-Compare and contrast strategies used in finding product using the carrying method and the African method using doubling and power 2
-Distinguish and understand product and exponents
-Verify and apply the algorithm to find product of different factors
-Organize data and be able to identify and use important information

Material

Map of Africa, calculator, paper, pencil, flip chart, and markers

Key Concepts

Concept of double
Factors and products
Exponents and powers
Concept of algorithm

Activity One: Mini Lecture

Students review factors, products, exponents, and powers of two. Using these as a springboard, students learn the algorithm for multiplication as used by West African.

Activity Two: Guided Practices

As a class, students find product using the algorithm taught in previous activity. Teacher guides students in the use of the algorithm. Students verify the product using conventional multiplication using carrying.

Activity Three: Independent Practice

In pairs students independently find the product of two factors and verify using the conventional multiplication by carrying. In large group, students discuss the usefulness of each method.

Assessment

Students complete a long test on West African algorithm where they show mastery in the use of the concepts.

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This is an output of a research undertaken at the Obafemi Awolowa University to teach math and science to Yoruba school teachers. It vividly describes the dilemma of the teacher educator as she struggles to understand the differences between Yoruba and scientific numbers.