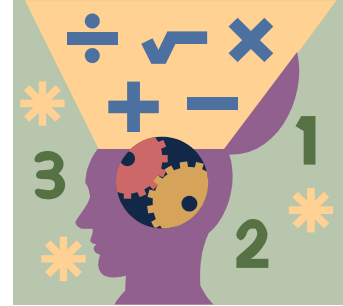


NCLB MATH INSTITUTE SUMMER 2011

Faculty Name: Ernestine Tucker
School: I. T. Montgomery Elementary School
Mound Bayou Public Schools

Grade Level: 3rd Grade



1 Teaching objective(s)

- **MS 2a.** Create, describe, and extend growing and repeating patterns with physical materials and symbols including numbers. (DOK 2)
- **MS 1a.** Compose and decompose four-digit whole numbers with representation in words, physical models, and expanded and standard form. (DOK 1)

2 Instructional Activities:

Introduction

Day 1

- The teacher will explain the objectives of the lesson, and then begin reading *One Grain of Rice* and discuss vocabulary as it comes up in the reading. The teacher will show one grain of rice on the overhead, then two, then four, and then eight as the story is read. Stop reading the ninth day in the story. (Page 38)
- The teacher will ask students, “What is a pattern?” (A list that occurs in some predictable way.) The teacher will discuss the math vocabulary list with students. (See Attachment 1)

Activity

- The teacher will group students in groups of 4s, and give each student a hundred chart and a hi-lighter. (See attachment 2) Tell students that you can use a hundred chart to find number patterns.
- The teacher will direct students’ attention to their hundred chart and then ask students to describe which numbers make patterns in rows, in columns, and in diagonals. Allow volunteers to answer. (Possible answers: row: skip count by 3s: column: skip-count by 5s: diagonal: skip-count by 9s.
- Teacher will then tell students to choose a number from 2 through 5. Then, shade that box on the hundred chart. Next, skip count by your number and shade each box you land on. (Teacher will assist students that need help)
- Teacher will have students describe the pattern they see on their hundred chart. Then allow them to compare their hundred chart with those of other classmates. Teacher will ask students “What do they notice about the patterns?” “How are they alike?” “How are they different?” (Answers will vary. Teacher will check students’ patterns)
- Teacher will ask students if they have any questions, and if anyone would like to share something they learned today in math. (Allow 2-3 students to share)
- Teacher will tell students that, “We learned to find number patterns on a hundred chart, now how would you use the hundred chart to find the next number in the pattern 13, 17, 21, 25, ___?” (29) Teacher will tell students that we will continue the story on tomorrow.

Day 2

Introduction

- Teacher will review the objectives, and then review the story with students up to the ninth day. (Page 38)
- Teacher will group students into groups of 4s and then review previous day's activity with students. (Finding number patterns).

Activity

- Teacher will pass out the problem table and have students fill in the table stopping at the ninth day. (See **attachment 3**)
- Teacher will ask students to share any patterns that they notice. (**Students will probably say that the pattern doubles every day, if so, tell them that doubling is multiplying**)
- Next, teacher will have students predict how many grains of rice Pong Lo will receive in all on the 30th day and have students complete the rest of the table.
- As students are working, teacher will ask if anyone can find an easier way to calculate the next day's rice amount without adding. (If needed, lead students to see that they can multiply by 2.) Teacher will have students complete the table multiplying by 2. (**Thirty Day-Five-hundred-thirty-six-million-eight-hundred-and-seventy-thousand-nine-hundred-and-twelve grains of rice-536,870,912**) (Calculators may be used as numbers get larger, teacher will assist students that need help)
- After students complete the table for thirty days, teacher will read the story to the fortieth day (To page 52) then, have students complete the table to the fortieth day. (**Five-hundred-forty-nine-billion-seven-hundred-fifty-five-million-eight-hundred-and-thirteen-thousand-eight-hundred-and-eighty-eight** grains of rice.
- Teacher will check students' tables and assist students that need help.
- After students have completed their tables to the fortieth day, teacher will ask volunteers to share what they learned today in math. (As many as time will allow)
- Teacher will ask students if they have any questions, concerns or comments. Allow students to respond.
- Next, teacher will tell students that today we learned to use multiplication/ doubling or multiplying by 2 to complete a table. Tell students that we will continue the story tomorrow.

Day 3

Introduction

- Teacher will review the objectives and then review the story with students up to page 52.
- Teacher will group students into groups of 4s and then, review previous day's activity with students. (**Doubling/multiplying by 2**)
- Teacher will tell students that today we are going to do an activity to compare the amount of rice Long Lo would have had if he had simply asked for double the number of the day it was. (**Example: on the 5th day, he'd get 2x5 or 10 grains**)

Activities

- Teacher will give each student a copy of the compare/contrast chart. (**See Attachment 4**) and tell students to complete the chart. (teacher will assist if needed)
- After students complete the chart, teacher will have them to examine both rice charts together and allow students to respond with any observations or comments.
- Teacher will direct students' attention back to the story by asking students, "Would you rather have \$0.10 everyday for 10 days or one penny on the first day and double that amount everyday for 10 days?"
- Teacher will allow students to think about the question for a while and then tell them that they are going to figure out how much money they would receive, depending on the decision made.
- Teacher will give students a copy of Doubling One Grain of Rice /Money Sheet. (**See attachment 5**) Teacher will have students complete the sheet and assist students as needed.
- After students complete the sheet teacher will discuss the answer with the students and talk about what that much money and that much rice would look like and then, discuss where Pong Lo would put it all. (Money and rice)
- Teacher will ask students if they have any questions or comments, and if anyone would like to tell about something they learned in math today. Teacher will allow students to respond.
- Teacher will tell students that today we demonstrated our doubling/multiplication skill to solve a problem and on tomorrow we will finish the story and complete another activity.

Day 4

Introduction

- Teacher will review the objectives and story with the students and tell the students that today we are going to complete our story and another activity on place value.
- Teacher will finish reading the story to the students and then group the students into groups of 4s.

- Teacher will tell students that digits are the symbols **0, 1, 2, 3, 4, 5, 6, 7, 8, and 9** and Place Value is when we give each digit in a number a value. In the story rice is used to show quantity. Pong Lo starts out with one grain of rice and ends up with more than one billion grains of rice. **(See attachment 1)**

Activity

- Teacher will tell students that on day 5, Pong Lo has 16 grains of rice. The first digit of the number is the ten's place. There is one ten in the number 16. In addition to the 1 ten there are 6 ones in the number 16.
- Teacher will give each student a container of colored rice and a place value chart. **(See attachment 6)** and tell students to demonstrate first using rice and then write the number in with their pencil.
- Teacher will have students demonstrate the number 16 on their place value chart using rice as the teacher demonstrates on the overhead. Teacher will check students' charts and give help if needed. **(One grain of rice in the tens place, and six grains of rice in the ones place)**
- Teacher will tell students to demonstrate the next 2 numbers **(day 6 and 7)** on their place value chart using rice and have a volunteer to explain the answer. **(On day 6, Pong Lo has 32 grains of rice. There are 3 tens in the number 32. There are 3 sets of tens. In addition to the 3 tens, there are 2 ones.) (On day 7, Pong Lo has 64 grains of rice. There are 6 tens in the number 64. There are 6 sets of tens. In addition to the 6 tens, there are 4 ones.)** Teacher will assist students that need help.
- Teacher will tell students that for the next numbers we will write them in on the place value chart and not demonstrate with rice. Teacher will have students place the rice back into the container and continue the lesson.
- Teacher will tell students that on the ninth day, Pong Lo has 256 grains of rice. How much is that? The number 256 has three digits. A different place value is given to each digit. The hundred's place is the first digit in this number. There are two sets of one hundred in the number 256. This number has two hundreds. **(Teacher will check students charts' as they continue with the lesson)**
- Teacher will tell the students that the middle digit of 256 is where we have the ten's place. We can see there are 5 tens or 5 sets of ten. We can see that in addition to the 2 hundreds, we have 5 tens. The last digit in the number 256 is 6. This is the one's place. There are 6 ones in the number 256. Now we see that there are 2 sets of 100, 5 sets of 10, and 6 ones in the number 256.
- Teacher will tell students that on day 10, Pong Lo has 512 grains of rice. How much is 512? What is the place value of that number? Allow volunteers to respond. **(Teacher will assist if needed)**
- Teacher will continue and tell students that the number 512 has three digits. If we look at the first digit in this number we can see that there are 5 sets of one hundred. It has 5 hundreds the middle digit in the number 512 is 1. We can see that there is 1 ten. In addition to the 5 hundreds, we have 1 ten. The last digit in 512 is the 2. There are 2 ones in the number 512. We can now see that there are 5 sets of 100, 1 set of 10, and 2 ones.

- Teacher will tell students that everyday Pong Lo receives more and more rice. On the twelfth day, he receives “about four handfuls”. On the sixteenth day, he receives “enough rice for two full bags”. On day twenty-nine, he receives enough rice to fill “two royal storehouses”. At the end of the story he has more than one billion grains of rice. Each of the numbers in the book can be broken down using place value.
- Teacher will ask students if anyone would like to share something that they learned in math today. Allow students to respond.
- Teacher will tell students that on tomorrow they will be assessed on the objectives taught this week. **(Finding patterns and place value) (See attachment 7)**

Day 5

Assessment:

(See Attachment 7)

Teacher will have students answer the following questions:

1. Find out how many grains of rice Pong Lo received on day 60.
Explain how you got your answer.
2. What do you notice about the grains of rice received each day? Describe the pattern you see in the table. (Day 2 Table)
3. On day 11, Pong Lo has 1,024 grains of rice. What is the place value of this four digit number?
4. Write two more numbers that go with the story.

3 **Materials and Resources:**

Materials:

- One Grain of Rice by Helena Clare Pittman
- Overhead projector
- Markers, hi-lighters, and pencils (one for each student)
- Transparency of table, hundred chart, vocabulary list, comparing chart, and place value chart
- Copies of table, hundred chart, comparing chart, digit cards, and assessment (one of each for each student)
- Colored Rice (a large container)
- Calculators (one for each pair of students)
- Doubling One Grain of Rice /Money Sheet (one for each student)
- Place Value Chart
- Assessment
- Answer Keys

Resources:

- One Grain of Rice by Helena Clare Pittman
- www.riceromp.com/teacher/lessonContentcfm?pId=225
- HSP Math Mississippi Edition, Teacher vol. 1
- www.mathwire.com/literature/litalgebra.html
- www.k-state.edu/smartbooks/Lesson056.html
- www.christiancottage.com/images/HundredChart.jpg
- mhtml://E:/RiceRomp Teachers-Math.mht
- <http://lessonopoly.org/node/7216&pop=TRUE>
- <http://www.eduref.org/cgi-bin/printlessons.cgi/Virtual/Lesson/Mathematics/Patterns/POTO...>

Attachment 1

Math Vocabulary:

- Patterns- a list that occurs in some predictable way.
- Digits-the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9.
- Place Value-is when we give each digit in a number a value.

Attachment 2

Hundreds Chart

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

Attachment 4

To compare, fill in the chart below to show how many grains of rice Pong Lo would have received if he had asked for double the number of days it was. (Example: on the fifth day, he would have gotten 2×5 or 10 grains.) Then look at each table to compare.

Comparison Table 1

| Day | Number of grains of Rice | Write out the Multiplication |
|-----|--------------------------|------------------------------|
| 1 | 1 | 1×1 |
| 2 | | |
| 3 | | |
| 10 | | |
| 40 | | |
| 60 | | |

Attachment 5:

Comparison Table 2

Doubling Money: Doubling \$0.10 vs. 1 penny (\$0.01)

“Would you rather have \$0.10 everyday for 10 days or would you rather get a penny on the first day and double that amount everyday for 10 days?”

\$0.10

| | | | | |
|--------------|--------------|--------------|--------------|---------------|
| Day 1 | Day 2 | Day 3 | Day 4 | Day 5 |
| Day 6 | Day 7 | Day 8 | Day 9 | Day 10 |
| | 1 | PENNY | | |
| Day 1 | Day 2 | Day 3 | Day 4 | Day 5 |
| Day 6 | Day 7 | Day 8 | Day 9 | Day 10 |

Attachment 7

Assessment:

Teacher will have students answer the following questions:

1. Find out how many grains of rice Pong Lo received on day 60.
Explain how you got your answer.
2. What do you notice about the grains of rice received each day? Describe the pattern you see in the table. (Day 2 Table)
3. On day 11, Pong Lo has 1,024 grains of rice. What is the place value of this four digit number?
4. Write two more numbers that go with the story.

Attachment 8

Answer Keys

Attachment 3a & 3b

Days 1-10

1, 2, 4, 8, 16, 32, 64, 128, 256, 512

Days 11-20

1,024, 2,048, 4,096, 8,192, 16,384, 32,768, 65,536, 131,072, 262,144, 524,288

Days 21-30

1,048,576, 2,097,152, 4,194,304, 8,388,608, 16,777,216, 33,554,432, 67,108,864

134,217,728, 268,435,456, 30th Day 536,870,912 31st Day 1,073,741,823

Attachment 4

Days 1-3

1grain-1x1

2grains-1x2

4grains-2x2

Day 10

20 grains-10x2

Day 40

80 grains-40x2

Day 60

120grains-60x2

Attachment 5

Days 1-10 (\$0.10)

\$0.10, \$0.20, \$0.30, \$0.40, \$0.50, \$0.60, \$0.70, \$0.80, \$0.90, & \$1.00

Days 1-10 (\$0.01) One Penny

\$0.01, \$0.02, \$0.04, \$0.08, \$0.16, \$0.32, \$0.64, \$1.28, \$2.56, & \$5.12

Attachment 7

1. 1,073,741,823-more than 1 billion grains of rice
2. Doubles or “times 2”
3. (1,024) the 1 is in the thousands place, 0 is in the hundreds place, 2 is in the tens place, and 4 is in the ones place.
4. Answers will vary

