Unit Design

Numbers Through T.I.M.E
(Today, Incan, Mayan, & Egyptian)

Grade Level:
8th

Content Areas:
Math and Social Studies

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Billie Stranz
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Standards and Benchmarks

Math:
A.8.4 Develop effective oral and written presentations that include:
   a. Appropriate use of technology
   b. The conventions of mathematical discourse
   c. Mathematical language
   d. Clear language
   e. Understanding of purpose and audience

B.8.1 Read, represent, and interpret various rational numbers with
   a. Verbal descriptions
   b. Geometric models
   c. Mathematical notation

Horizontal Connections:

Social Studies:
A. 8.9 Describe how buildings and their decorations reflect cultural values and ideas, providing examples such as cave paintings, pyramids, sacred cities, castles, and cathedrals.

B.8.1 Interpret the past using a variety of sources such as biographies, diaries, journals, artifacts, eyewitness interviews, and other primary source materials, and evaluate the credibility of sources used.

Concepts:
System
Symbols
Location
Culture
<table>
<thead>
<tr>
<th><strong>Generalizations:</strong></th>
<th><strong>Essential/Guiding Questions:</strong></th>
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</table>
| Each civilization developed different symbols to represent their number system. | EQ: How did different cultures represent their numbers?  
GQ: What different civilizations had their own number systems?  
GQ: What symbols were used in each civilization?  
GQ: What type of surroundings did the civilization have?  
GQ: What do these terms mean? (base 10, numeration system, civilization) |
| Symbols used are dependent upon the location of each civilization. | EQ: Why did cultures use the symbols they did?  
GQ: What symbols were used in each civilization?  
GQ: Where were the civilizations located?  
GQ: What time period did they exist?  
GQ: When were they developed? |
Benchmark: Math: A.8.4 Develop effective oral and written presentations that include:

- Appropriate use of technology
- The conventions of mathematical discourse
- Mathematical language
- Clear language
- Understanding of purpose and audience

<table>
<thead>
<tr>
<th>Benchmark Proficiency Criteria</th>
<th>Learning Target</th>
<th>Method of Assessment</th>
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<tbody>
<tr>
<td>1. Know content vocabulary (number system, base 10)</td>
<td>K, S</td>
<td>SR, CR</td>
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<tr>
<td>2. Understand Base 10 system</td>
<td>S</td>
<td>SR, CR, O</td>
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<tr>
<td>3. Understand and interpret number systems other than base 10</td>
<td>S</td>
<td>SR, CR, O</td>
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<tr>
<td>4. Develop own number system</td>
<td>K, S, P</td>
<td>PA</td>
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</tbody>
</table>

K = Knowledge  
P = Product  
S = Skill  
R = Reasoning  
D = Dispositions

CR = Constructed Response  
SR = Selected Response  
P = Product  
PA = Performance Assessment  
O = Observation  
PC = Personal Communication  
PF = Portfolio
Benchmark: Math: B.8.1 Read, represent, and interpret various rational numbers with
   a. Verbal descriptions
   b. Geometric models
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<tr>
<td>1. Know and understand various symbols of each culture</td>
<td>S</td>
<td>SR, CR</td>
</tr>
<tr>
<td>2. Be able to read and represent any number through a picture or model appropriate to each society</td>
<td>K, S, P</td>
<td>SR, CR, O</td>
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Benchmark: Social Studies: A. 8.9 Describe how buildings and their decorations reflect cultural values and ideas, providing examples such as cave paintings, pyramids, sacred cities, castles, and cathedrals.

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<td>1. Location(geography) of various early civilizations</td>
<td>K</td>
<td>CR, SR, O</td>
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<tr>
<td>2. Know content vocabulary</td>
<td>K</td>
<td>CR, SR</td>
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<tr>
<td>3. Understand how/why these early civilizations developed</td>
<td>S</td>
<td>CR, SR</td>
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Benchmark: Social Studies: B.8.1 Interpret the past using a variety of sources such as biographies, diaries, journals, artifacts, eyewitness interviews, and other primary source materials, and evaluate the credibility of sources used.

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<td>1. Symbols</td>
<td>K</td>
<td>CR, SR</td>
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<tr>
<td>2. Understand each civilizations through artifacts</td>
<td>K, R</td>
<td>PC</td>
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### Baseline Assessment

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<th>Instruction</th>
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<td><strong>Baseline</strong></td>
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<tr>
<td>Formative Assessment:</td>
<td>Understand baseline 10</td>
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<tr>
<td>Worksheet</td>
<td>Understand numeration system</td>
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<td>Teacher observations</td>
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<tr>
<td>Discussion</td>
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<td>Formative Assessment:</td>
<td>Basic background knowledge of early civilizations: Mayan, Inca, and Egyptian.</td>
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<td>Create a map to show where each early civilization was located.</td>
<td>Locations of each civilization.</td>
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<td>Begin to create a graphic organizer</td>
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<td>Teacher observations</td>
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<tr>
<td>Formative Assessment:</td>
<td>Each civilization will be studied according to how their number systems developed for each civilization.</td>
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<tr>
<td>Continue to fill in Graphic Organizer</td>
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<tr>
<td>Worksheet-number systems</td>
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<td>Teacher observations</td>
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<tr>
<td>Formative Assessment:</td>
<td>Understanding how each early civilization developed through the use of artifacts.</td>
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<td>Teacher observations</td>
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<tr>
<td>Activities-make a Stela, Quipu, and a number quilt.</td>
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### Performance Assessment

**See Performance Assessment and Rubric (page 13 and 14)**

*Field trip to Neville Public Museum will be taken after the completion of the unit.*
Baseline Assessment

Name:        Class:

Math

Benchmark #: A.8.4 Develop effective oral and written presentations that include:
 a. Appropriate use of technology
 b. The conventions of mathematical discourse
 c. Mathematical language
 d. Clear language
 e. Understanding of purpose and audience

1. What is a numeration system?

2. Many numeration systems use different bases. What base do we use in our numeration system today?

3. Please list the different numeration systems that you know of and give an example of each.

4. How would you represent 21 objects in base 5?

Benchmark #: B.8.1 Read, represent, and interpret various rational numbers with
 a. Verbal descriptions
 b. Geometric models
 c. Mathematical notation

1. Change to Egyptian numerals.
   a. 9        b. 23        c. 453

2. Change to Roman numerals.
   a. 76       b. 49        c. 192

3. Change to Mayan numerals.
   a. 17       b. 51        c. 275

4. Change to numerals we use.
   a. XXXVIII   b. •••        c. ∩ ∩   
Social Studies

Benchmark #: A. 8.9 Describe how buildings and their decorations reflect cultural values and ideas, providing examples such as cave paintings, pyramids, sacred cities, castles, and cathedrals.

1. Use the map below to locate the following civilizations. Make sure to use a key!
   Mayan  Inca  Egyptian

2. Define the following words in sentences and pictures.
   civilization  geography  symbol  artifact  hieroglyphics  culture

3. Which civilization developed an advanced calendar?

4. What took great engineering and architectural skills to build the Inca Civilization and why?

5. The Egyptian civilization is well known for their pyramids. How did they make the step pyramid? (Hint-5 steps)
Benchmark #: B.8.1 Interpret the past using a variety of sources such as biographies, diaries, journals, artifacts, eyewitness interviews, and other primary source materials, and evaluate the credibility of sources used.

1. What is this artifact? What early civilization used this? Explain how this was used.

2. What is this artifact? What early civilization used this? Explain how this was used.

3. What is a Hieroglyph? What early civilization used this? Explain how this was used.
**Baseline Scoring**

**Math**

**Benchmark #:** A.8.4 Develop effective oral and written presentations that include:
  a. Appropriate use of technology
  b. The conventions of mathematical discourse
  c. Mathematical language
  d. Clear language
  e. Understanding of purpose and audience

6 points total

5-6 correct = 3 (proficient)
3-4 correct = 2 (approaching proficiency)
0-2 correct = 1 (not proficient)

**Benchmark #:** B.8.1 Read, represent, and interpret various rational numbers with
  a. Verbal descriptions
  b. Geometric models
  c. Mathematical notation

12 points total

9-12 correct = 3 (proficient)
5-8 correct = 2 (approaching proficiency)
0-4 correct = 1 (not proficient)

**Social Studies**

**Benchmark #:** A. 8.9 Describe how buildings and their decorations reflect cultural values and ideas, providing examples such as cave paintings, pyramids, sacred cities, castles, and cathedrals.

23 points total

16-23 correct = 3 (proficient)
8-15 correct = 2 (approaching proficiency)
0-7 correct = 1 (not proficient)

**Benchmark #:** B.8.1 Interpret the past using a variety of sources such as biographies, diaries, journals, artifacts, eyewitness interviews, and other primary source materials, and evaluate the credibility of sources used.

9 points total

6-9 correct = 3 (proficient)
3-5 correct = 2 (approaching proficiency)
0-2 correct = 1 (not proficient)
**Performance Assessment**

**Goal:** The student demonstrates understanding about the critical component of the unit topic (Use generalizations to guide writing the goal)

Your goal is to create your own number system relevant to your lifestyle. Think of something in your life that has a lot of meaning to you and use symbols from that to represent your number system. Example: A teacher might use apples and pencils for a number system.

**Scenario:** The student is placed in a real-world situation in which the student assumes a role with an authentic audience. (Use G.R.A.S.P.S to guide writing the scenario)

You have been hired by the John Kohler Michael Arts Center to create a number system that represents various lifestyles. Your final product will be displayed in a special exhibit funded by the John Michael Kohler Arts Center.

Role: Historian

Audience: Children and adults from all over Wisconsin and surrounding areas.

**Evaluation Criteria:** The student meets the criteria for benchmark proficiency by producing evidence of learning.

Product: You must make an oral presentation showing your own original number system.

Criteria:
A visual or model of your number system must be present.
Explain how you developed your number system.
Clearly express your ideas through a presentation format of your choice.
Use accurate information that clearly reflects the lifestyle that uses the Number system such as facts, artifacts, pictures, statistics, etc…
### Performance Assessment Rubric

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<th>Benchmark # A.8.4</th>
<th>Rubric Scale</th>
<th>Comments</th>
<th>Score</th>
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</table>
| 4 Presentation includes an interesting visual/model of number system and demonstrates a clear explanation of number system, lifestyle, and development. | Math 88-100  
Social Studies 90-100 | | |
| 3 Presentation includes a visual/model of number system and explained how it was developed. | Math 76-87  
Social Studies 80-89 | | |
| 2 Presentation includes a visual/model of number system and explanation of how it was developed was difficult to understand. | Math 63-75  
Social Studies 70-79 | | |
| 1 Presentation did not include visual/model of number system or was not explained how it was developed. | Math 50-62  
Social Studies 60-69 | | |
Unit Title: Numbers Through T.I.M.E.  Time: One day  Lesson #: 1

Key concept/understanding/skill: Numeration Systems and Base 10

Materials/Resources:
Textbook, Transition Mathematics
Worksheet-Packet
Base 10 blocks-optional

Classroom Setup: Regular classroom set up. Work time-groups of 2-3 as necessary.

Instructional Plan:
Note: The baseline assessment will be given previous to this lesson.
1. Present students with brief introduction of daily activities and goals.
2. Ask students for definitions of number system, numeration systems. Discussion can take place on these topics.
3. Introduce different number systems from p. 5 in textbook. Discuss how our numbers have come to be written.
4. Introduce and explain our Base 10 system.
   - Use base 10 blocks to help with this concept. Introduce the symbols needed for base 10 (0,1,2,3,4,5,6,7,8,9) and explain other bases (base 5, 20, 2)
   - Show map of areas in the world where different bases are used.
   - Have students work on converting numbers into different bases both in picture form and in number form. This can be done individually or with a partner.
5. Complete the worksheet in the packet on number systems and base 10 for homework.

Learning Strategies: Concrete objects-base 10 blocks, partner discussion

Assessment Connection: Worksheet in packet, teacher observations, discussion, baseline

Teacher notes/reflections:
Unit Title: Numbers Through T.I.M.E.  
Time: 2-3 days  
Lesson #: 2

Key concept/understanding/skill: Early Civilizations and Locations  
(Mayan, Incan, Egyptian)

Materials/Resources:  
Textbook, The American Nation  
Maps-The Basic Not Boring World History pg. 25  
Graphic Organizer-Packet  
Atlas-Rand McNally Classroom Atlas  
Colored pencils/markers/crayons  
Numbers Through T.I.M.E Packet  
Notes for lecture

Classroom Setup: Regular classroom set up. Work time-groups of 2-3 as necessary.

Instructional Plan:  
NOTE: Lesson 2 and 3 can be done in various orders. Either all the history of the civilizations at once and then the mathematical information all at once or the history of one civilization and then the mathematical information of that civilization.  
NOTE: Also, there is an activity for each type of civilization. These can be done all at the end or after each civilization has been discussed. (Lessons 4, 5, 6)

1. Present students with brief introduction of daily activities and goals.  
2. Introduce each early civilization while students take notes on lecture. (refer to packet)  
3. Brief discussion on each early civilization during and after the lecture. Address the following questions: what do they know, what do they want to find out, and what did they learn? (KWL)  
4. Map work-students will now use their map of the world to locate the three early civilizations. Students will use three different colors to make a key and identify the early civilizations correctly on their maps. Students will use materials listed above for reference to locations of the civilizations.  
5. Graphic Organizer (in packet)-Students will begin to fill in the knowledge learned for the daily activities. This will be an on going process for all civilizations and mathematical information.

Learning Strategies: Note-taking skills, listening skills, map skills, filling out a graphic organizer, KWL strategy.

Assessment Connection: Map, graphic organizer, teacher observations, notes, baseline

Teacher notes/reflectons:
Unit Title: Numbers Through T.I.M.E.  Time: 2-3 days  Lesson #: 3

Key concept/understanding/skill: Number Systems of Early Civilizations

Materials/Resources:
Numbers Through T.I.M.E packet
High Interest Mathematics Activities for Enrichment and Extension-pg.25
Problem Solving Through Investigation Discovery Activities for Math Enrichment-pg. 22
Graphic Organizer-Packet
Class notes for lecture

Classroom Setup: Normal classroom set up. Students will work in groups of two to three while working on worksheets and conversion on number systems.

Instructional Plan:
NOTE: See note on lesson 2.
1. Present students with brief introduction of daily activities and goals. Hold a brief discussion of previous lesson-feedback session.
2. Present each number system on overhead and students will take notes.
3. After each number system is presented, examples will be given so students can practice each number system.
4. Students will be put in groups to practice each number system and then they will be given individual practice sheets.
5. Finish filling in the Graphic Organizer with the information learned from this lesson. The Graphic Organizer should now be complete.

Learning Strategies: Taking notes, listening to a lecture, filling out a graphic organizer, worksheet practice on converting Maya, Inca, and Egyptian number systems to our numbers and vice versa.

Assessment Connection: Graphic organizer, teacher observations, worksheet on number systems, notes, class participation, baseline

Teacher notes/reflectons:
**Unit Title**: Numbers Through T.I.M.E.  
**Time**: 1-2 days  
**Lesson #**: 4

**Key concept/understanding/skill**: Create a Mayan Stela

**Materials/Resources**:  
Culture Counts: People, Patterns, and Pi - pgs.42&43  
Numbers Through T.I. M. E. Packet  
Markers, Colored Pencils, Pens, Pencils  
Colored paper  
Glue  
Shoeboxes or other material that stacks  
Scissors

**Neville Public Museum Artifact**: Mayan Stela

**Classroom Setup**: Regular classroom set up. Materials will be set up earlier to this lesson and students will work at their desks/tables in groups to complete the project.

**Instructional Plan**:  
NOTE: The night before this lesson, have students take home the packet and find events that were significant in each year. They may need to ask family members for help with some of this information.

1. Present students with brief introduction of daily activities and goals. Hold a brief discussion of previous lesson-feedback session.
2. Brief discussion on the history of the Mayan Stela, what is it, why was it used, what does it represent, etc…
3. Discuss the events that were important in each year that the students have brought to class. Vote on which items should be included on the class Stela.
4. Explain activity (packet). Group students to create their part of the Stela.
5. Gather materials and allow students to have the rest of the class period to work on their project.
6. When finished, students will stack their boxes (using glue) to create a classroom Stela.
7. Discussion of the finished Stela.

**Learning Strategies**: Use previous knowledge of the Mayan number system to create a Stela of significant events in their lives.

**Assessment Connection**: Finished product, participation, teacher observations

**Teacher notes/ reflections:**
Unit Title: Numbers Through T.I.M.E.  

Time: 1-2 days  

Lesson #: 5

Key concept/understanding/skill: Create an Incan Quipu-(Pronounced KEE poo)

Materials/Resources:  
Textbook, *Mathematics Methods for Elementary and Middle School Teachers*  
Numbers Through T.I.M.E. packet  
Yarn or colored twine (many colors)  
Pencil and paper

*Neville Public Museum Artifact: Incan Quipu*

Classroom Setup: Regular classroom set up. Materials will be set up earlier to this lesson and students will work at their desks/tables to complete the project.

Instructional Plan:  
1. Present students with brief introduction of daily activities and goals. Hold a brief discussion of previous lesson-feedback session.  
2. Brief discussion on the history of the Incan Quipu. What is it? Why was it used? What does it represent? etc…  
3. Explain activity-packet  
4. Answer the questions under the procedure before beginning activity.  
5. Show how to make each knot on the Quipu and practice these before starting.  
6. As a class, create a Quipu using each student’s birthdates.  
7. Work time on making Quipu Knots.  
8. Show and tell session at the end of class.  
9. Display for all to see!

Learning Strategies: Understand the Incan number system and apply it to make Quipu Knots.

Assessment Connection: Finished product, teacher observations, participation

Teacher notes/Reflections:
Unit Title: Numbers Through T.I.M.E.   Time: 1-2 days   Lesson #: 6

Key concept/understanding/skill: Create an Egyptian Number quilt.

Materials/Resources:
Culture Counts: People, Patterns, and Pi-pgs.6&7-quilt pattern
Numbers Through T.I.M.E. packet
Scissors, thread, sewing needles, needles, straight pins, fabric (various colors), paper, backing material, iron, tag board (for stencils of numbers/letters), fabric paints, and felt

Classroom Setup: Regular classroom set up. Materials will be set up earlier to this lesson and students will work at their desks/tables to complete the project.

Instructional Plan:
1. Present students with brief introduction of daily activities and goals. Hold a brief discussion of previous lesson-feedback session.
2. Brief discussion on the history of the Quilt. What is it? Why was it used? What does it represent? etc…
3. Review of Egyptian number symbols.
4. Explain Quilt activity (packet). Make sure to follow the steps.
5. Work time on making their quilt squares.
6. Assemble quilt.
7. Show and tell session at the end of class.
8. Display for all to see!

Learning Strategies: Create an Egyptian quilt using the Egyptian number systems correctly.

Assessment Connection: Finished product, discussion, teacher observations, participation

Teacher notes/reflections:
Unit Title: Numbers Through T.I.M.E.   Time: 2-3 days   Lesson #: 7

Key concept/understanding/skill: Understand basic numbers systems other that our own and apply these skills to create an original number system.

Materials/Resources:
Numbers Through T.I.M.E. packet
Performance Assessment-Packet
Various materials depending on what students want to use such as: Poster board, paper, markers, glue, fabrics, colored pencils etc..

Classroom Setup: Normal classroom set up

Instructional Plan:
NOTE: You might want to inform students about the performance assessment at the beginning of the unit so that they can be thinking about which kind of number system they might want to use.

1. Present students with brief introduction of daily activities and goals. Hold a brief discussion of previous lesson-feedback session.
2. Introduce performance assessment in packet
3. Explain project: Students will create their own number system relevant to their lifestyle.
4. Explain Rubric and presentations. Have students sign up for presentation dates and times.
5. Work time on project
6. Presentations by students
7. Discussion/feedback on project

Note: After the completion of this unit, a summative assessment will be given to the students and data will be recorded.

Learning Strategies: Prior knowledge of early civilization number systems, Mayan, Inca, and Egyptian. Oral and written communication. Ability to express ideas, develop what students have learned through the unit through this cumulative project.

Assessment Connection: Refer to performance assessment rubric, teacher observations, and participation.

Teacher notes/ reflections:
## Individual Record Keeping

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<tr>
<th>Name:</th>
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<tr>
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<th>Benchmark # Social Studies A.8.9</th>
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**RECORDING**

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<td>Number of students at 1 = __________</td>
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Numbers Through Time (Today, Incan, Mayan, Egyptian)

Ms. Stranz and Mrs. Wenninger
Fall 2003

Student Information Packet
Name___________________________
Base 10 and Numeration Systems

1. What is a numeration system?

2. What type of numeration system do we use today?

3. What are the symbols that we use for our numeration system?

4. What other bases are used in numeration systems?

Practice Problems.

5. Draw the number 486 using pictures of base 10 blocks.

6. Change the number 68 into base 5.

7. Change the number 23 into base 2.

8. Change the number 594 into base 20.
<table>
<thead>
<tr>
<th>Civilization</th>
<th>Location</th>
<th>Time Period</th>
<th>Achievements</th>
<th>Number System</th>
<th>Other Facts</th>
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<tbody>
<tr>
<td>Mayan</td>
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<tr>
<td>Incan</td>
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<tr>
<td>Egyptian</td>
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</tbody>
</table>
Mayan Number System

Change these numbers to the Mayan numerals.

1. 14     2. 19     3. 22
4. 34     5. 267     6. 963

Egyptian Number System

Change these numbers to the Egyptian numerals.

7. 6     8. 12     9. 163
10. 1,257     11. 30,134     12. 124,902
Mayan Stela

With friends and family, please come up with a significant event that happened in each year. If you think of more than one, write all ideas down.

1984

1985

1986

1987

1988

1989

1990

1991

1992

1993

1994

1995

1996

1997

1998

1999

2000

2001

2002

2003
Mayan Stela Instructions

You will be put into groups of four to six and will be creating a part of the classroom Stela. Once we have decided on the items to be included in the Stela, you will be responsible for four drawings and years, written in Mayan symbols.

1. You will need to change each year into the Mayan numeral system. Make sure that these years are correct before continuing. Use this space to change the year into Mayan numerals.

2. You will need to come up with a drawing for each event chosen for each year. You may use any materials needed to create a picture for that event.

3. The year and the drawing should be placed next to each other with the year on the left side of the paper and the drawing on the right side of the paper.

4. Your group will then place the finished drawings on the classroom Stela.
Incan Quipu

Questions
1. Why did the Incas use different color strings?
2. Why is location on the string important to the Quipu?

Types of Knots

Single knot:

Figure 8 knot:

Long knot:

Classroom Quipu

We will be creating a classroom Quipu. You will need to practice making the different types of knots. We are going to create a Quipu that shows the number of days that each person has been alive to this point.

Your birthday (month, date, year):

Multiply the number of years old you are by 365.

Add the number of days since your last birthday. You may want to check a calendar to make sure!

This is the number of days that you are going to show on your Quipu string. Carefully tie your knots remembering the place value positions!!!
**Egyptian Number Quilt**

We will be creating a large quilt showing different Egyptian numerals. You will be responsible for making one square of the quilt.

1. Choose a number that you would like to represent for the quilt.

2. Translate into Egyptian numerals.

3. Practice writing the symbols for the number.

4. Choose a way of showing the Egyptian symbol on your piece of fabric. Make a draft of your drawing on a square of paper.

5. Transfer onto the fabric. You may use any of the materials available to create your symbols.

6. When you are finished, let dry (if needed) or prepare to attach to quilt.
Performance Assessment

**Goal**: The student demonstrates understanding about the critical component of the unit topic (Use generalizations to guide writing the goal)

Your goal is to create your own number system relevant to your lifestyle. Think of something in your life that has a lot of meaning to you and use symbols from that to represent your number system. Example: A teacher might use apples and pencils for a number system.

**Scenario**: The student is placed in a real-world situation in which the student assumes a role with an authentic audience. (Use G.R.A.S.P.S to guide writing the scenario)

You have been hired by the John Kohler Michael Arts Center to create a number system that represents various lifestyles. Your final product will be displayed in a special exhibit funded by the John Michael Kohler Arts Center.

**Role**: Historian

**Audience**: Children and adults from all over Wisconsin and surrounding areas.

**Evaluation Criteria**: The student meets the criteria for benchmark proficiency by producing evidence of learning.

**Product**: You must make an oral presentation showing your own original number system.

**Criteria**:
- A visual or model of your number system must be present.
- Explain how you developed your number system.
- Clearly express your ideas through a presentation format of your choice.
- Use accurate information that clearly reflects the lifestyle that uses the number system such as facts, artifacts, pictures, statistics, etc.
## Performance Assessment Rubric

<table>
<thead>
<tr>
<th>Benchmark # A.8.4</th>
<th>Rubric Scale</th>
<th>Comments</th>
<th>Score</th>
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<tbody>
<tr>
<td>4</td>
<td>Presentation includes an interesting visual/model of number system and demonstrates a clear explanation of number system, lifestyle, and development.</td>
<td>Math 88-100</td>
<td>S sociah 90-100</td>
</tr>
<tr>
<td>3</td>
<td>Presentation includes a visual/model of number system and explained how it was developed.</td>
<td>Math 76-87</td>
<td>Sociah 80-89</td>
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<tr>
<td>2</td>
<td>Presentation includes a visual/model of number system and explanation of how it was developed was difficult to understand.</td>
<td>Math 63-75</td>
<td>Sociah 70-79</td>
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<tr>
<td>1</td>
<td>Presentation did not include visual/model of number system or was not explained how it was developed.</td>
<td>Math 50-62</td>
<td>Sociah 60-69</td>
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</table>
The Egyptian
Numerical Systems Through T.I.M.E
(Today, Incan, Mayan, & Egyptian)

For centuries the people of Egypt have called their country the “gift of the Nile.”
The river gives them water, fertile soil, and transportation.

**Basic Facts**
- Three major land areas, Nile River Valley, the Sinai Peninsula, and desert areas.
- Nile River supplies 85% of the country’s water; it is life for an Egyptian!
- Word EGYPT came from a word originated by the Greeks, as *Ae-gyp-t-os*.
- Used the process of mummification of their dead
- Farmers
- Pharaohs ruled the land
- Book of the Dead—scrolls with advice to the deceased about the ideas of the wrongs that a good person avoided was placed with them.

**Egyptian Achievements**
Made paper created from papyrus trees
- Hieroglyphics was a form of writing used by the Egyptians
- Calendar was based on the sun.
- Developed the Step Pyramid—5 stages see below

1. The first stage was the building of an unusual square stone mastaba 206’ x 206’ x 26’ (63m x 63m x 8m) (others were rectangular), with an underground burial chamber. The core masonry was made of small stone blocks, laid like bricks. The stone mastaba was faced with fine limestone, which proves it was intended to be a finished building.

2. The second stage comprised the addition of ten feet (3m) of fine limestone around the perimeter of the mastaba.

3. The third stage was the addition of a further twenty-five foot (7.5m) extension to the eastern face, providing a rectangular ground plan. An additional central shaft, a series of corridors and a tomb chamber were also dug.

4. The fourth stage was the construction of a four-tiered structure of stone, weighing 200,000 tons, on top of the existing tomb structure.

5. The fifth stage was the addition of two more steps and the final six-tiered pyramid, was, in turn, faced with fine limestone, to give it a smooth finish.
The Incan
Numbers Through T.I.M.E
(Today, Incan, Mayan, & Egyptian)

The largest Indian Empire in the mountainous land of Peru, and Indian people who spoke the in gauge called Quechua (Ke4ch wah) built a mighty empire. These Indians, known as the Incas ruled the largest American Indian Empire.

Basic Facts
-Inca Empire was gained between 1438 and 1493. They existed from 1100 – 1527.
-Had no written language
-Capital was Cuzo (Koos koh), population of 100,000 people.
-Location: Stretched from Ecuador all the way along the west coast of South American to Chile’s capital Santiago.
- Farmers terraced the sides of mountains and built elaborate irrigation systems.
-Gold and silver metalwork. Gold was very sacred and used to decorate their temples.
-Built huge stone temples high up in the mountains usually towards the sun.

Incan Achievements
-Quipu (KEE poo) made of a series of strings and knots were used to represent a particular quantity.
-Made a series of roads, walls, and bridges.
-Had a system called the mita, which forced labor.
-Farmlands were divided into three parts, a way to establish rule.
  1. Farming community
  2. Inca gods
  3. Government

Incan Legends
-Where did they come from? What do you think?

The sun created a son and a daughter, set them upon an island in Lake Titicaca, gave them a staff of gold, and bade them settle where the staff disappeared into the ground. The brother and sister—the future king and queen traveled north to the valley of Cuzo, where the golden staff disappeared into the ground. There they stayed and founded the city of Cuzo about A.D 1200.
The Mayan
Numbers Through T.I.M.E
(Today, Incan, Mayan, & Egyptian)

The Maya pronounced My.uh were Native Americans who lived in the Yucan Peninsula and Central America-locate on your map.

**Basic Facts:**
-250 A.D to 900 A.D Mayan civilization flourished.
-Theory that they believed that their ancestors crossed the Bering Straight at least 20,000 years ago.
-Location: Yucatan present day Mexico, Guatemala, western Honduras, El Salvador, and northern Belize.
-Skilled farmers clearing huge sections of land.
-Made trade networks with distant peoples.

**Mayan Achievements**
-Astronomy: Created an observatory a place to study the sky. Used glyphs a writing system developed to record what they saw in the sky.
-Mathematics: Number system based on Symbols-base 20
-Arts: Architecture such at the Mayan city of Chyichen. Itza(CHH.chehn EET.suh) this city consists of huge religious pyramids. They were also weavers, painters, potters, and metal workers.
-Invented the first calendar and hieroglyphic writing in the Western hemisphere.
-Used glyphs a writing system developed to record what they saw in the heavens.
-Stela was used to record events usually in 20-year periods.

**The Mayan Mystery**
-What happened to the Mayan? Why did they abandon their cities?
-No one really knows the exact answers to these questions, but take a look at the following theories and make a decision for yourself.
  1. Problems related to food supply
  2. Plagues of locusts ruined the harvest
  3. Natural disasters, such as earthquakes may have happened
  4. Warlike invaders from central Mexico
  5. Others?
Mayan Math

-Base 20
-Base 20 system is still in use today by tribes such as the Hopi and Inuit
-Used three symbols—a dot for one, a bar for five, and a shell for zero....
-Numbers could be written horizontally or vertically
-(far simpler than the Romans who lived at the same time)

Mayan Calendar-
-Two calendars-
-Ritual calendar-Tzolkin-260 days long contained 13 “months” of 20 days each---each month was named
   after one of the 13 gods
-365 day civil calendar called the Haab-consisted of 18 months each with 20 days named
   after agricultural or religious events and a short “month” of only 5 days called the Wayeb----Maya did not wash, comb their hair or do any work during the Wayeb
-Two calendars would return to the same start every 52 years

1, 872, 000 day cycle of time called the Long Count (13 bak’tun)
a day (k’in) a month (winal-20 k’ins) a year (tun-18 winals or 360 days)
k’atun (20 tuns or 7200 days) bak’tun (20 ka’tuns or 144, 000 days)

Mayan Stela
-Read from the top to bottom
-First row has the introductory glyph
-place values are arranged vertically

For more information:

Book- Secrets in Stone-Mayan Hieroglyphs-
your Mayan birthday……www.halfmoon.org/date.html p. 41-Activities
www.niti.org/mayan/lesson.htm
www.mayacalendar.com/mayastelacustom.html
Maya Stela
-shows the pictures of the five symbols for the days listed above
www.mayacalendar.com/understand.html
www.hanksville.org/yucatan/mayamath.html
   good charts for kids!!!!!!!!!
Egyptian Math

- base 10 system using hieroglyphs for numerals
- did not have a symbol for zero
- symbols for one (a single stroke), ten (a hobble of cattle), hundred (a coil of rope), thousand (a lotus plant),
  ten thousand (a finger), hundred thousand (a tadpole or frog), and million (a god with arm raised above his head)
- a grouping system
- did not use place value
- highest number is always written in front of the lower number
- can stack the hieroglyphs rather than writing them in one straight line
- 3000BC - had already developed their hieroglyphic writing and numerals
- numerals can be found on temples, stone monuments and vases
- also written on papyrus

For more information:
www-groups.dcs.st-and.ac.us/~history/HistTopics/Egyptian_numerals.html
warrensburg.k12.mo.us/math/egypt/jessica/jessica.html

Incan Math

- Had a method of recording numerical information which did not require writing. It involved knots in
  string called Quipu
- Base ten decimal system
- No symbol for zero
- A number was represented by knots in the string, using a positional base ten representation
- Spacing has to be highly regular so that zero positions would be clear
- Numbers were recorded on strings of a particular color to identify what that number was recording
- Certain colors were important
- Yellow for gold, white for peace, and red for army

For more information:
Wiscinfo.doit.wisc.edu/chaysimire/titulo2/khipus/what.htm
How to make the knots
www-groups.dcs.st-and.ac.uk/~history/HistTopics/Inca_mathematics.html
www.sfu.ca/archaeology/museum/laarch/inca/quie/html
how to make your own Quipu
  Ch. 9 extended activity….Quipu Knots
Resources


