

SYRACUSE UNIVERSITY

Lesson Plan # 2: Research Ancient Number Systems

IST 663: Assignment 3b

Elizabeth Roberts

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GENERAL INFORMATION

Lesson Plan Title: Researching Ancient Number Systems

Related Curricular Area: Math

Appropriate Grade Level(s): 5th Grade

Motivational Profile:

Attention	Low	Medium	High
Comment: While starting to push boundaries, most students are attentive when they are asked because they connect with their classroom teacher. They may have lesson attention with the librarian .			
Relevance	Low	Medium	High
Comment: The topic is related to both their math studies and social studies and can be very exciting when student discover the connection between what they already understand and when and where those concepts were discovered.			
Confidence	Low	Medium	High
Comment: Depending on the level of the child, there is a range of confidence levels. This is especially true with group work because each child responds differently to a group setting, some thriving while others can't keep up.			
Satisfaction	Low	Medium	High
Comment: The culminating presentation will provide an outlet for students to really show what they have learned and be proud of their product, leading to satisfaction.			

Required Time: 7 days during Math block, each block approximately 60 minutes

Collaborative Potential: Classroom Teacher

Overview: Students, working in small groups, will build on their research skills such as using search terms and locating relevant information to research ancient number systems and present them to their classmates.

CONTENT TOPIC:

Math, History, Information Literacy

CONNECTION TO CONTENT STANDARD(S):

State: Independent International School (Based on AERO math standards)

Standard(s):

Math, Grade 5, Number Sense, Place Value and Operations

- Students will understand and apply numbers, ways of representing numbers, relationships among numbers, and number systems.
 - Numbers and Number Sense- Students will understand and demonstrate a sense of what numbers mean and how they are used. Students will be able to:

- **Counting:** Count by thousands, ten thousands, and hundred thousands, starting at any number from 1 to 999,999
- **Reading and Writing Numbers:** Read and write numbers to at least 1,000,000
- **Ordering and Comparing (Whole Numbers):** Compare and order numbers from 0 to at least 1,000,000 using the words equal to, greater than, less than, greatest, or least when appropriate
- **Ordering and Comparing (Numbers):** Read, write, compare, and order all whole numbers, fractions, mixed numbers and decimals using multiple strategies (e.g. symbols, manipulative, number line, and place value concepts)
- Operations on Numbers- Students will understand meanings of operations and how they relate to one another. Students will be able to
 - **Computation Whole numbers:** Add, subtract, multiply, and divide (with and without remainders) using non-negative rational numbers.
- Numerical Operations and Estimation- Students will accurately calculate and use estimation techniques, number relationships, operation rules, and algorithms; they will determine the reasonableness of answers and the accuracy of solutions.
 - **Estimation:** Use mental math and estimation strategies to predict the results of computations (i.e., whole numbers, addition and subtraction of fractions) and to test the reasonableness of solutions.

AASL STANDARDS FOR THE 21ST CENTURY LEARNER GOALS

Standard 1: Inquire, think critically, and gain knowledge

- **Skills**
 - **1.1.4** Find, evaluate, and select appropriate sources to answer questions.
 - **1.1.5** Evaluate information found in selected sources on the basis of accuracy, validity, appropriateness for needs, importance, and social and cultural context.
- **Dispositions in Action**
 - **1.2.2** Demonstrate confidence and self-direction by making independent choices in the selection of resources and information.
 - **1.2.6** Display emotional resilience by persisting in information searching despite challenges.
- **Responsibilities**
 - **1.3.1** Respect copyright/intellectual property rights of creators and producers.
 - **1.3.5** Use information technology responsibly.

Standard 2: Draw conclusions, make informed decision, apply knowledge to new situations, and create new knowledge.

- **Skills**
 - **2.1.2** Organize knowledge so that it is useful.
 - **2.1.6** Use the writing process, media and visual literacy, and technology skills to create products that express new understandings.
- **Self-Assessment Strategies**
 - **2.4.2** Reflect on systematic process, and assess for completeness of investigation

Standard 3: Share knowledge and participate ethically and productively as members of our democratic society.

- **Skills**
 - **3.1.2** Participate and collaborate as members of a social and intellectual network of learners
 - **3.1.4** Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use and assess.
- **Disposition in Action**
 - **3.2.3** Demonstrate teamwork by working productively with others
- **Self-Assessment strategies**
 - **3.4.2** Assess the quality and effectiveness of the learning product
 - **3.4.3** Assess own ability to work with others in a group setting by evaluating varied roles, leadership, and demonstrations of respect for other viewpoints.

ASSESSMENT & CRITERIA

Product (and related AASL indicators):

- Students will produce a presentation using PowerPoint, Prezi, Moviemaker or other software of their choice to demonstrate their learning about their ancient number system. The presentation will also include a reference list.
- Students will also be given a quiz after all the presentations about the content of all the different number systems.

Process (and related AASL indicators):

- Teachers will observe students as they search, gather, evaluate the information they need for their presentation. Teachers will also use prepared rubrics to check in with students along at each stage of the process.

RESOURCES AND OTHER MATERIALS:

- Books
- Websites
- Computers with access to internet
- Projector
- Handouts including Rubric, Quiz etc.
- PowerPoint, Prezi or Moviemaker
- Movie-Ancient Number Systems- <http://video.google.com/videoplay?docid=-1957179570191443503#>
- Project Reflection
- Ancient number system quiz

INSTRUCTION AND ACTIVITIES

Direct Instruction:

Day 1:

1. Students are introduced to the project. The topic of ancient numbers is introduced through a BBC video on the topic.

Day 2:

1. The classroom teacher and librarian collaboratively explain the requirements and give handout with the rubric.
2. Librarian teaches how to evaluate an online resource. Using example of both good and bad websites. Librarian will show a website and ask students the following questions for general discussion:
 - a. Is this website useful? Why or why not?
 - b. Is the information accurate? How can we tell?
3. There is also a review of the requirements for citing sources, especially webpages.

Day 4: At the beginning of day 3, the librarian gives a quick overview of the different presentation software students can use, including PowerPoint, Prezi and Moviemaker. Teacher reviews the rubric and students are reminded what needs to be included in their presentations.

Modeling and Guided Practice:

Day 2: Students are given the last 20 minutes of class to begin exploring their number system, including what it looks like and how it is used to make calculations. During that time, teacher and librarian observe and guide students in their discovery and choice of websites.

Day 3: Students are given the full period to research more about their topic. At the end of the 60 minute block, each group must check in with the teacher to make sure they are on track to proceed to the next step or if they need to continue their research as homework.

Day 4 & 5: Students are given the remainder of their class period and the following period to put the presentation together. The teacher and librarian are continually supporting students, checking in with them and asking questions about their project and pointing them to the rubric.

Independent Practice: Students need to finish their presentations and practice for the class presentation so that they are ready for presentations beginning day 5.

Sharing and Reflecting:

Day 6 & 7: Student will present their number system to their classmate and each student will fill out an evaluation form for their group experience. They will also give verbal feedback to their classmates and ask questions after each group presents.

Supporting Material(s)	Description
Project Systems Project Description	Handout explaining the project
Ancient Systems Presentation Grading Rubric	Rubric for how the presentations will be graded
Ancient Systems Project Outline	Outline for students to take notes with
Ancient Project Reflection	Worksheet where they will evaluate themselves
Ancient Systems Final Quiz	Quiz
Story of 1	Video about ancient number systems