Maya Hieroglyphics, Cosmology and Numerology: basis and meaning in Art

Maya Hieroglyphic writing, including their written numbers, appear in three remaining ancient books, on vases, in mural paintings and on carved stone structures dating from circa 100 BC – AD 1250.

“Dresden Codex” bark paper screen folded book (codex), Classic Maya, provenience unknown
“Murals”, painted wall, Xultun, Guatemala
“Seven Gods of the Underworld” painted clay, Classic Maya, Naranjo, Guatemala [and K 8425]
“Stela F” sandstone carving, Classic Maya, Quirigua, Guatemala

Maya Uses of Numbers
History / Cosmology / Numerology / Abstraction

Counting System: dot for one, bar for five and stylized shell for zero. These three numerals are used in a positional base twenty counting system written vertically, beginning at the bottom of the column with the ones position.

Historical Time
Long Count
Ex: “Seven Gods of the Underworld”, Naranjo [4 Ajaw 8 Kumk’u]
Establishes a date in time at the beginning of the present Great Cycle that began on August 13th, 3,114 BC. December 21st, AD 2012 will be an important anniversary within this cycle, but according to the Maya it is simply be a mark in time similar to the end of a century, not an end of time.

Three Examples of Maya Cyclical Calendars Based on Astrological Phenomena

1] Ritual Calendar: 260 days 13 numbers 20 day names
Ex: Jaguar Waj [animal spirit] of a lord from Seibal on K 771

2] Solar Calendar: 365 days 18 months 20 days
5 Uayeb unlucky days
[ritual 260 day calendar and the Solar Calendar line up every 52 years in a count of days known to Mayanists as the Calendar Round]
Ex. “Castillo” Chichen Itza, Mexico [fall equinox 21 September] snake shadow on the pyramid

3] Venus Calendar: This calendar of 584 day charts the movement of the planet Venus, a body in the sky the Maya believed could see with the naked eye. Many of their calculations in their books [especially the Dresden] and on their monuments correlate the movements of Venus with the movement of other bodies in the sky: eg. Commensuration of 5 Venus cycles 5x584 = 2,920 with 8 Solar cycles 8 x 360 = 2,920 [Dresden pg. 50 18 D]
Ex: “Yax Pasaj Standing on a Venus Glyph” carved deer tibia, carefully buried with other objects in a cache, Copan, Honduras

Historical and Conceptual Time
“Stela F” carved sandstone, Quirigua, Guatemala 7.3 meters (dedicated March 17th, 761 [9.16.10.0.0]) linked to a date 24 trillion years into the past in a place called ik najb nal (black water place)
Number and numerology as present in the calendrical calculations of the inscriptions

Aesthetics of Maya Numbers

Figuration and Abstraction: Quirigua Stela D and Copan Stela D
### Mayan Number Chart

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<tr>
<th>Number</th>
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**Activity 1:** Using beans, peas or m&ms for dots, straws for bars and shells for zeros or just by using the blackboard, make sure students understand:

1 k’in = 1 day, so 19 days would look like this (see also attached Mayan number chart):

```

+4 = 19
5+
5+
5+
```

**Activity 2:** How would you write 820 in a Mayan notational system?

First, an explanation:

1 k’in = 1 day
20 k’in = 1 winal or a 20 day month
18 winal = 1 tun or 360 days or a year
20 tun = 1 k’atun or 7,200 days (20 years)
20 k’atun = 1 bak’tun or 144,000 days (about 394 years)

```

2 tun (2 x 360) = 720 days
5 winal (5 x 20) = 100 days +
0 k’in = 0 days (serves as a placeholder for the 1st 20’s position)
```

**Activity 3:** Show why 2012 is an important year on the Mayan calendar and what it would look like on a Mayan stele.

How do we get to the Winter Solstice of 2012 (December 21, 2012) as the completion of the 13th bak’tun?

Mayan numbers are stacked from bottom to top, so one bak’tun is one dot and four shells stacked up on top of each other like this:

```

1 bak’tun (144,000 days)
0 k’atun
0 tun
0 winal
0 k’in
```

The end of a bak’tun – and the end of the 13th bak’tun - is simply the end of a very long period of time.
Now, to demonstrate that this connects 3,114 BC (the Mayan beginning of time) to 2012 AD, divide the total number of days by the number of days in a solar year.

**When dividing by 365, it doesn’t add up correctly, so don’t forget leap years!**

Divide 1,872,000 by 365.19 (which includes leap years) = 5,126 years from the Mayan account of the beginning of time, as the Mayans calculated the beginning of the world at 3,114 BC.

Subtract 3,114 years (BC) from 5,126 (total number of years for 13 bak’tun) = 2012 – or the 13th bak’tun as the end of the long count calendar.

So for the 13th bak’tun, multiply 144,000 x 13 = 1,872,000 days. The 13th bak’tun = 1,872,000 days from 3,114 BC.

Here’s how it should look:

```
13 bak’tun (13 x 144,000) or 1,872,000 days from 3,114 BC = 2012
0 k’atun (placeholder for 400 years) = a shell
0 tun (placeholder for 20 years) = a shell
0 winal (placeholder for 1 year) = a shell
0 k’in (placeholder for 1 month) = a shell
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Lesson 1, Mayan Math Activity

Activity 1: Using beans, peas or m&ms for dots, straws for bars and shells for zeros or just by using the blackboard, make sure students understand:

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--------  5+
--------  5+
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Activity 2: How would you write 820 in a Mayan notational system?

First, an explanation:

After 19 k’in,
20 k’in = 1 winal or a 20 day month
18 winal = 1 tun or 360 days or a year

Mayan numbers are stacked from bottom to top:

```
* *  2 tun (2 x 360) = 720 days
--------  5 winal (5 x 20) = 100 days +
(-)  0 k’in = 0 days (serves as a placeholder for the 20’s position)
```

Activity 3: Show why 2012 is an important year on the Mayan calendar and what it would look like on a Mayan stele.

How do we get to the Winter Solstice of 2012 (December 21, 2012) as the completion of the 13th bak’tun? To continue, 20 tun = 1 k’atun or 7,200 days (20 years), and 20 k’atun = 1 bak’tun or 144,000 days (about 394 years), so one bak’tun is one dot and four shells stacked up on top of each other like this:

```
•  1 bak’tun (144,000 days)
```

(-)  0 k’atun
(-)  0 tun
(-)  0 winal
(-)  0 k’in
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Lesson 2

Guided Observation Worksheet

Adapted from materials from the Yale Art Gallery and the Yale Center for British Art

Find an object or work of art, and spend 2 – 5 minutes closely observing it. If you are in a museum, do not read the exhibit label that gives information about the object or work of art.

After your observation time, answer the following questions in the following order. For questions 1 and 2, lists are fine (complete sentences not necessary).

1. What do you see?

2. What do you notice?

3. How was it made and what does it appear to be made from?
4. If you are looking at an artifact, why might it have been made? What might it have been used for? If you are looking at a work of art, why do you think the artist produced this work? What is going on in the piece?

5. Now read the exhibit label (if there is one) and record:

   Name/Title of object or work of art: _______________________________________________

   If an artifact, where in the world it is from: _____________________________________________

   If a work of art, artist’s name and year of completion: ___________________________________

   Any other descriptive information from the exhibit label:
Lesson 2

Object-Based Learning Strategies

Adapted from materials by Jessica Sack, Yale Art Gallery, and Cyra Levenson, Yale Center for British Art

Begin by having students closely observe an object or work of art, 2 – 5 minutes depending on how much time you have and the complexity of the object or work of art. If you are using a museum exhibit, cover the label or encourage them not to look at it.

Proceed by asking questions about the object or work of art, in the following order:

1. **What do you see?**
   With this purely objective question, they are generating a list of words or statements, using only their eyes. This can be an inventory-like list if they are looking at a painting or a diorama, and more of a list of adjectives if looking at a single object. You can encourage them to toss out words as they come to mind.

2. **What do you notice?**
   This goes deeper, and is intended to walk the line between objective and subjective. You may remind them not to include their opinion if you want to keep this more objective. Here, they should begin to point out relationships. They may also discuss how it appears to have been made. If they have an object in front of them that they are allowed to touch, they can use other senses at this point to learn more about it.

3. **What do you think about what you see? What are your interpretations of the evidence you observed?**
   Finally you are asking here for their interpretation and opinion – if a painting, what is going on in the piece, what is the narrative – if an artifact, why might it have been made, what might it have been used for?

4. **Follow answers to steps 2 and 3 with: What do you see that makes you say that?**
   This makes students accountable for their observations/interpretations by citing visual evidence, and can also help keep students from heading off in the wrong direction or intentionally derailing the process.

5. **Finally, ask more guided questions**, especially if you have a specific area of focus you are trying to bring to your students’ attention. You can also ask: “What questions do you have about it?” and “How can you find answers to these questions?” If in a museum, let them read the exhibit label at this point and ask them if that changes anything about their interpretation. If an artifact, you can now give more detail and history, and begin a more productive discussion about its cultural and chronological context.

Variation: There is a good opportunity to have students DRAW the object between steps 2 and 3, and then write a story about/featuring their object, which gets at the same interpretive thinking as step 3 but gives an opportunity for creative writing.

Usually, before you even have students start observing you would give them some context (specific artists, time periods, cultures) or the focus/objectives of the session – this helps steer their observations into a more narrow and manageable subset.