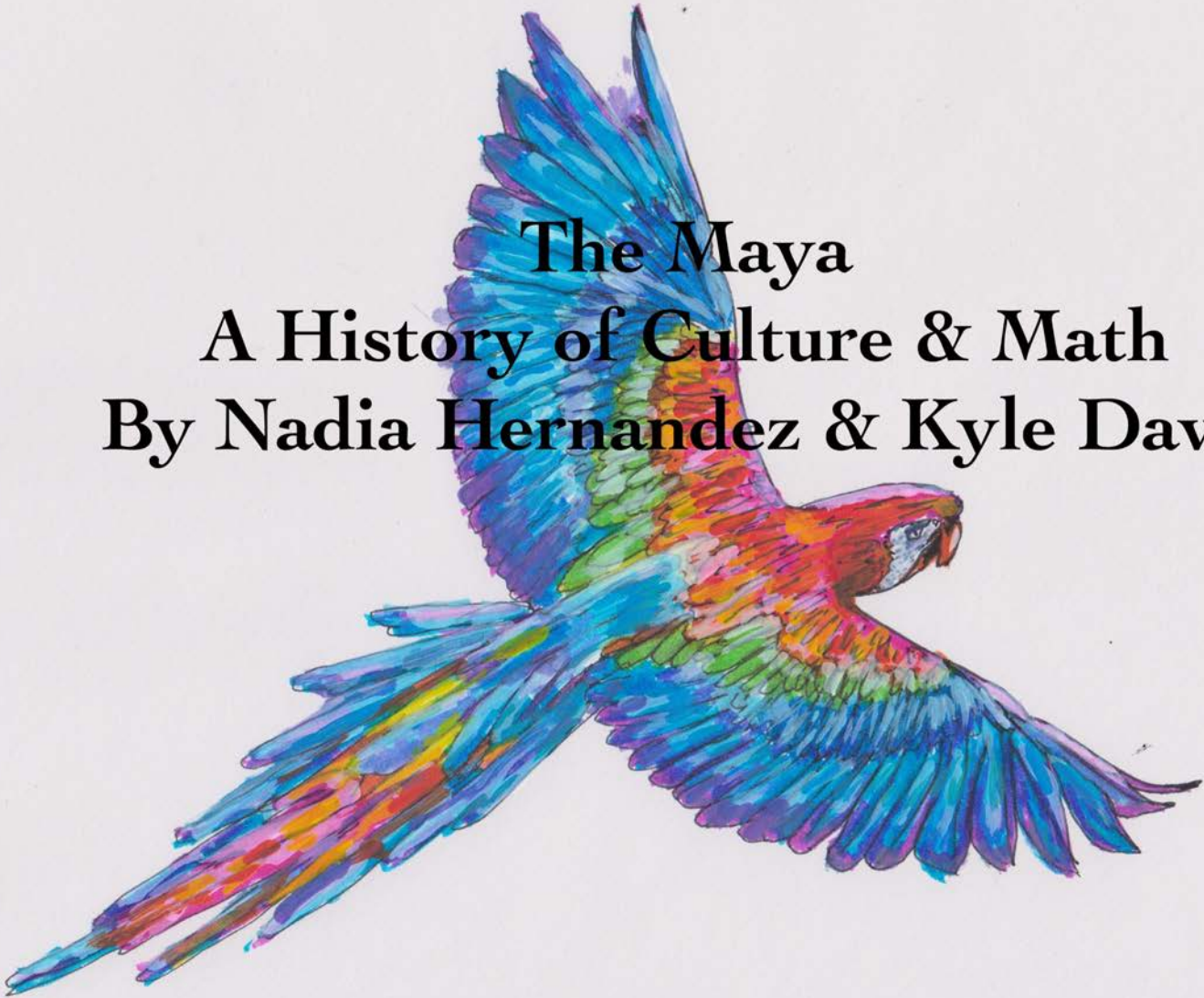
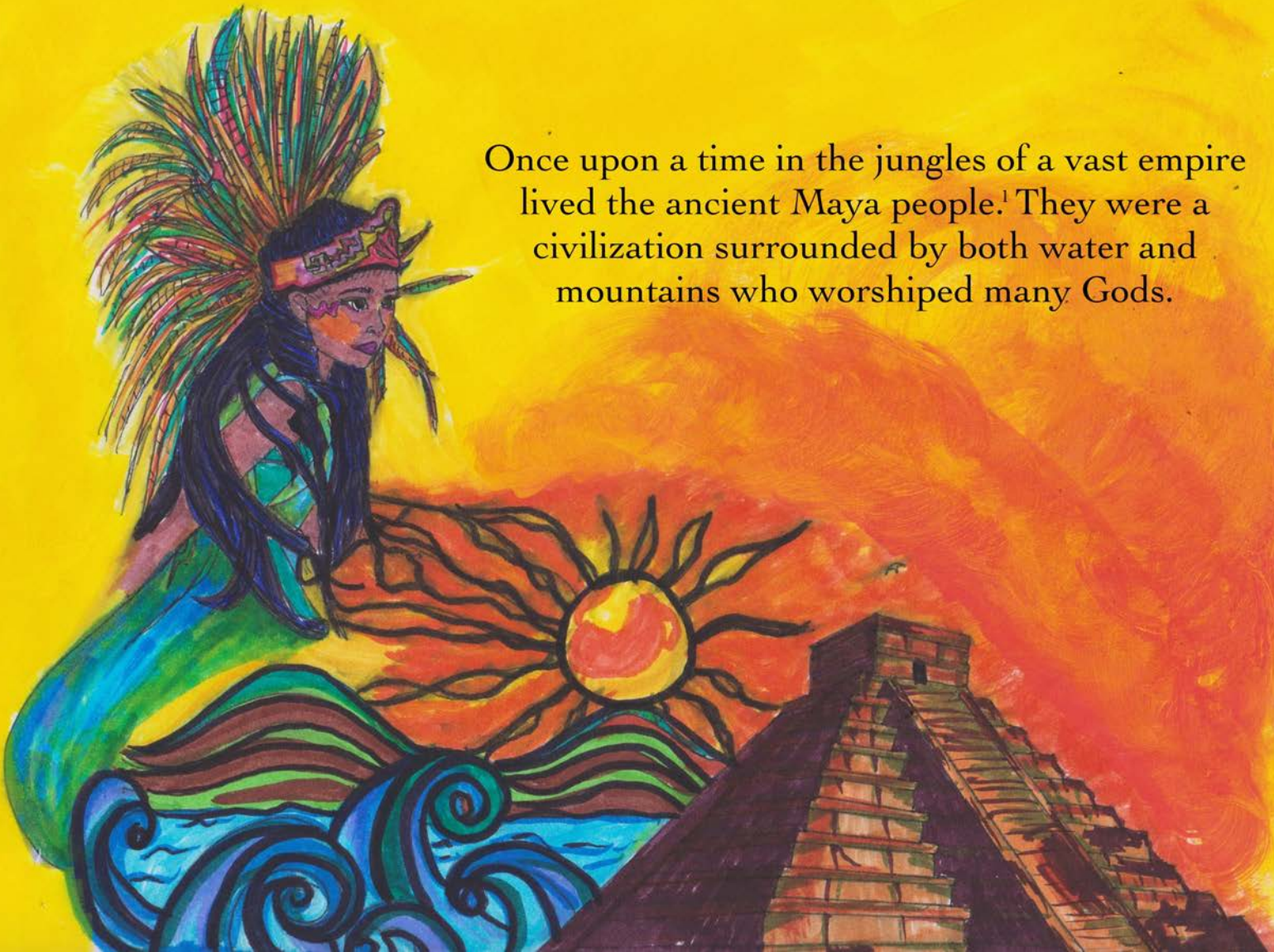
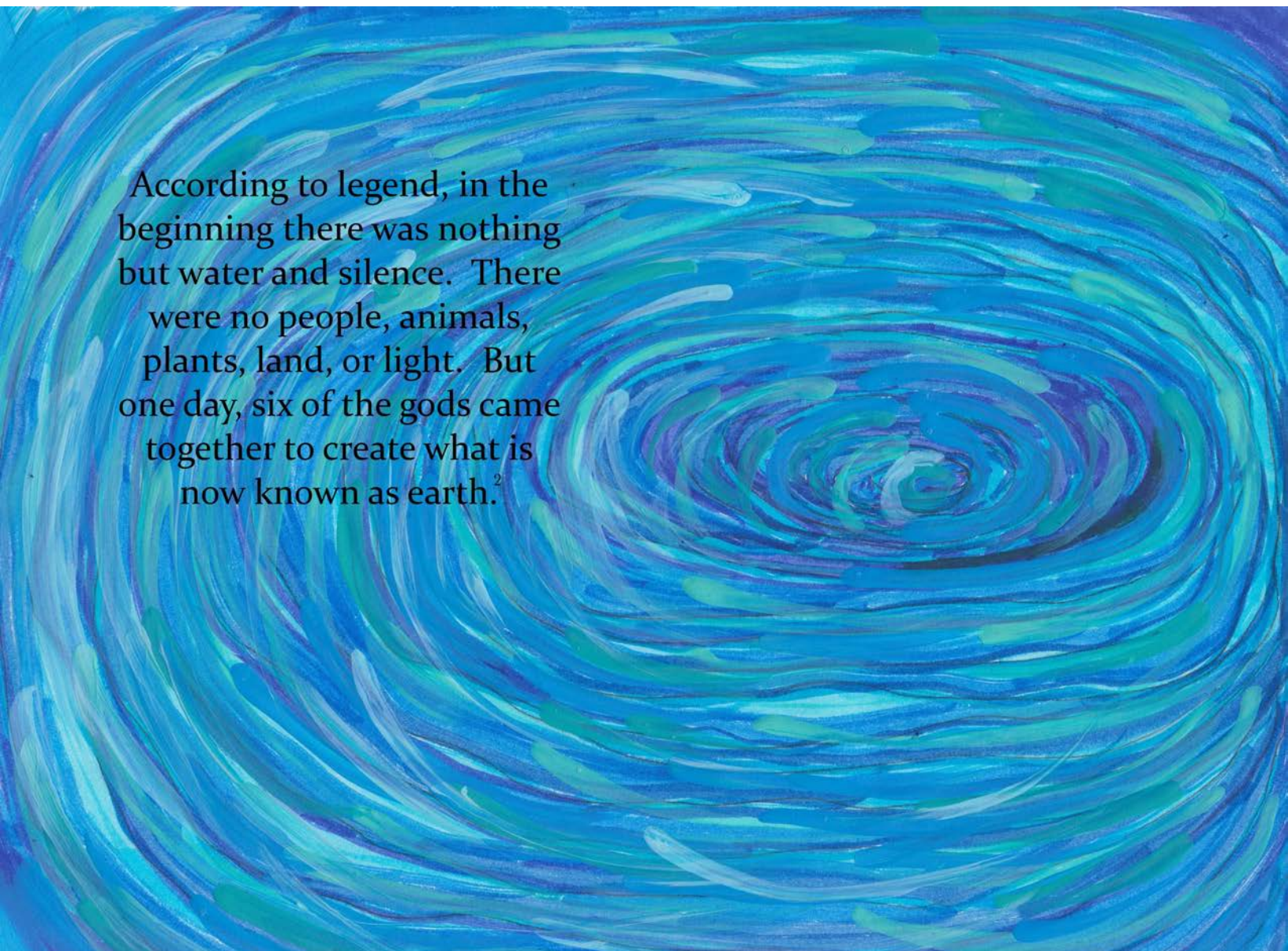


**The Maya**  
**A History of Culture & Math**  
**By Nadia Hernandez & Kyle Davis**



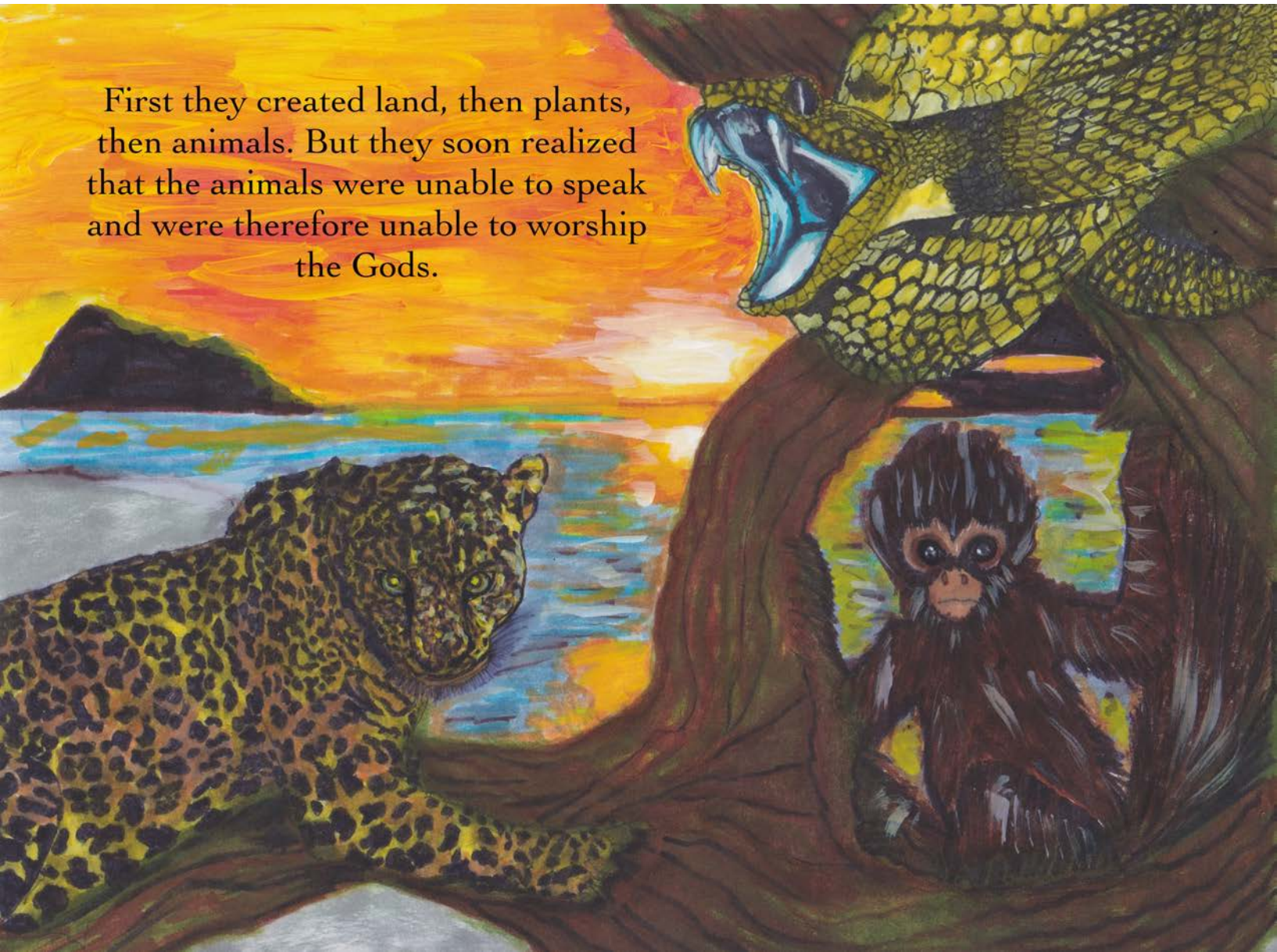
Once upon a time in the jungles of a vast empire lived the ancient Maya people.<sup>1</sup> They were a civilization surrounded by both water and mountains who worshiped many Gods.

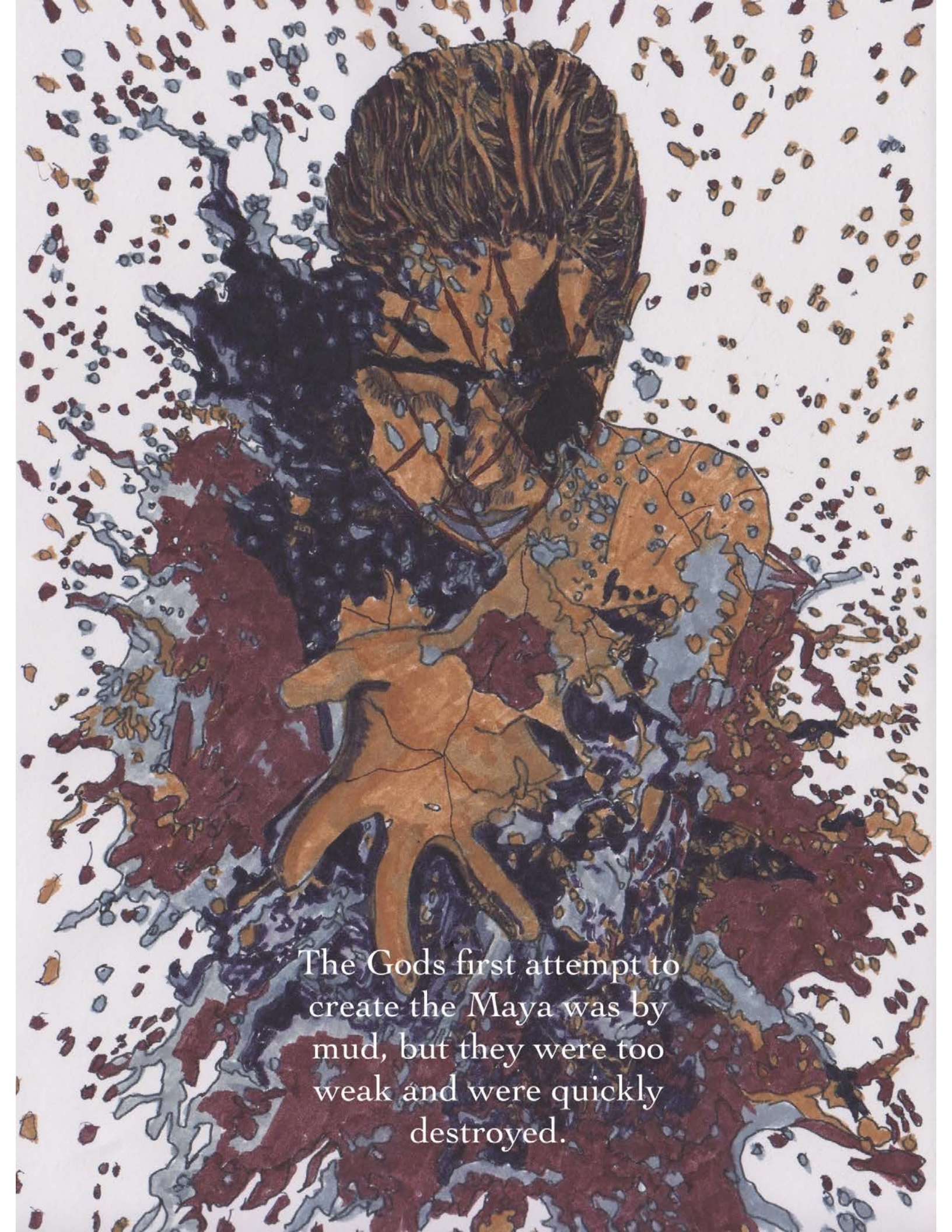





According to legend, in the beginning there was nothing but water and silence. There were no people, animals, plants, land, or light. But one day, six of the gods came together to create what is now known as earth.<sup>2</sup>

First they created land, then plants,  
then animals. But they soon realized  
that the animals were unable to speak  
and were therefore unable to worship  
the Gods.





The Gods first attempt to  
create the Maya was by  
mud, but they were too  
weak and were quickly  
destroyed.

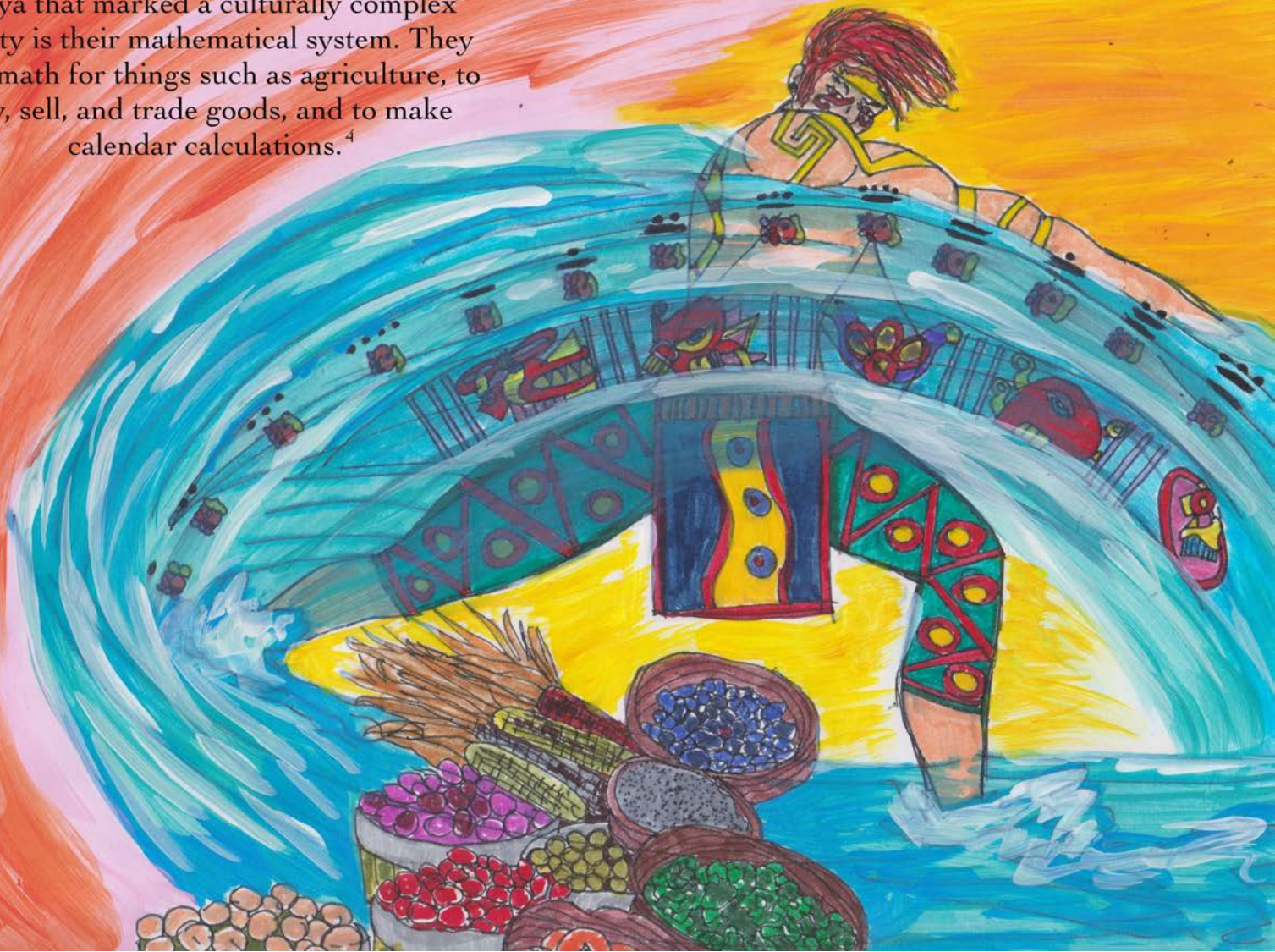


They then attempted to create men  
from wood and women from grass.  
However, the humans soon  
abandoned their gods and were  
washed away by floods. Those who  
survived were turned to monkeys,  
stripped of their ability to be  
completely human.































After the making of the sun and the moon, the Gods' third and final attempt at human creation came soon after when they molded the Maya from white and yellow maize. The humans were now able to worship and nourish the Gods as well as to create a complex culture.<sup>3</sup>



One of the most important traits of the Maya that marked a culturally complex society is their mathematical system. They used math for things such as agriculture, to buy, sell, and trade goods, and to make calendar calculations.<sup>4</sup>

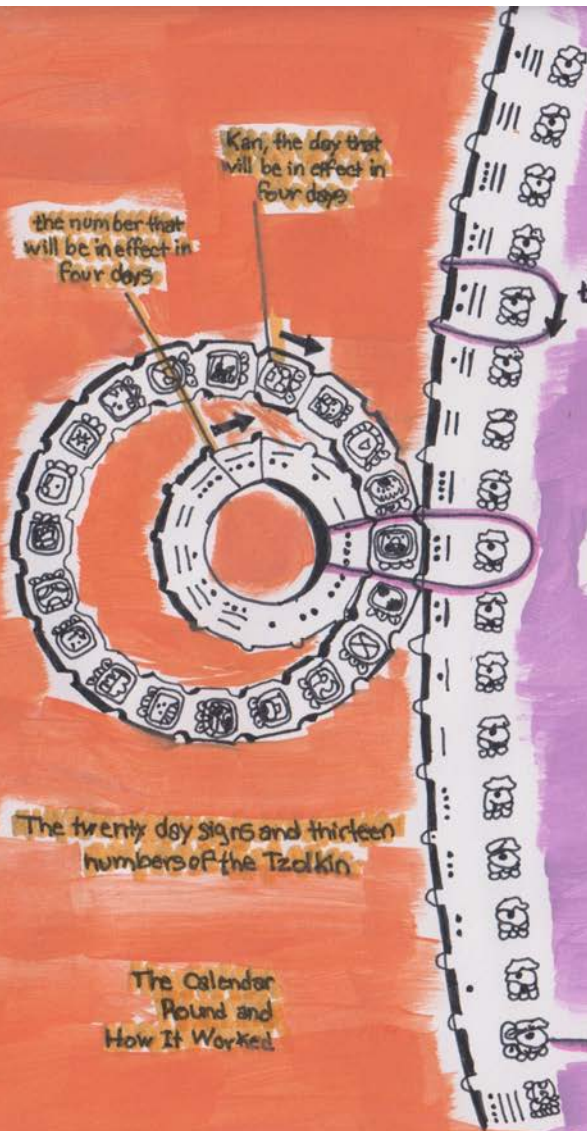




0 	1 	2 	3 	4 
5 	6 	7 	8 	9 
10 	11 	12 	13 	14 
15 	16 	17 	18 	19 
20 	21 	22 	23 	24 
25 	26 	27 	28 	29 

Not only are the Maya one of the first known cultures to come up with the concept of zero, but the way that they counted their numbers allowed for really easy as well as really hard math. They used stones to represent one, and bars or sticks to represent 5. So every time they had five stones, they would just replace it with one stick. If they had 3 sticks, then they had a value of 15.<sup>5</sup>

This led to the creation of the maya calendar system. There were three calendars that were created: the Tzolkin, Haab and Long Count calendars. The Tzolkin or sacred calendar consisted of 20 periods each with 13 days for a 260-day count. The priests who kept the calendars used the Tzolkin to determine days for sowing and harvest, military triumphs, religious ceremonies and divination.<sup>6</sup>



The twenty day signs and thirteen numbers of the Tzolkin

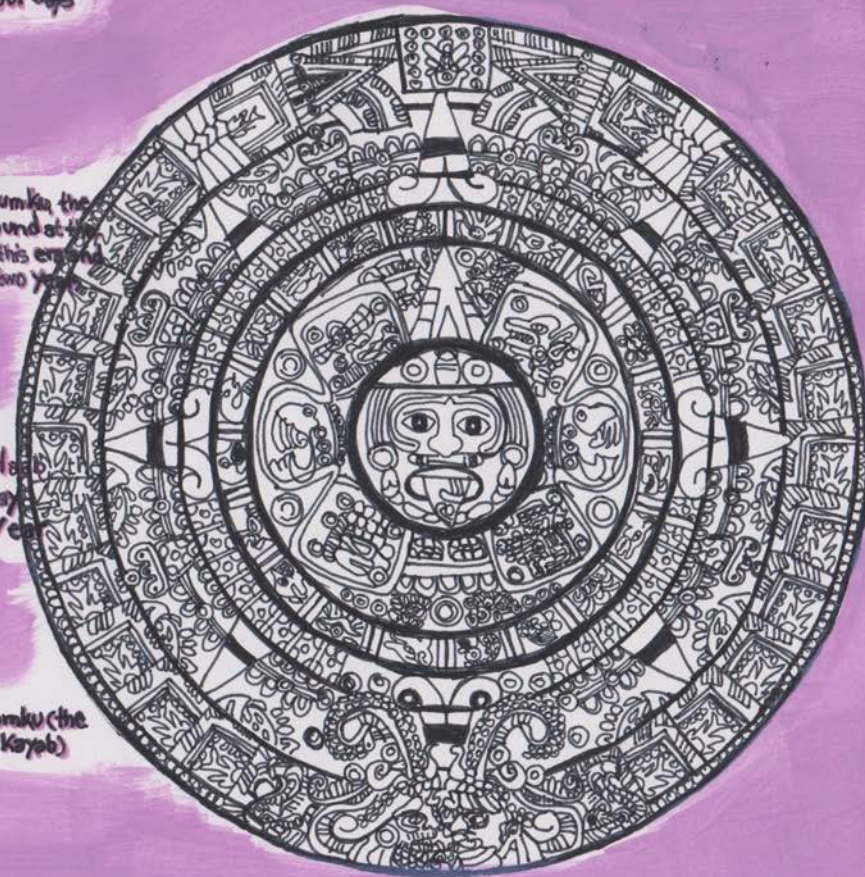
The Calendar Round and How It Worked



4 Ahau 8 Cumku, the Calendar Round at the beginning of this era and every fifty-two years

The Haab 365-day Year

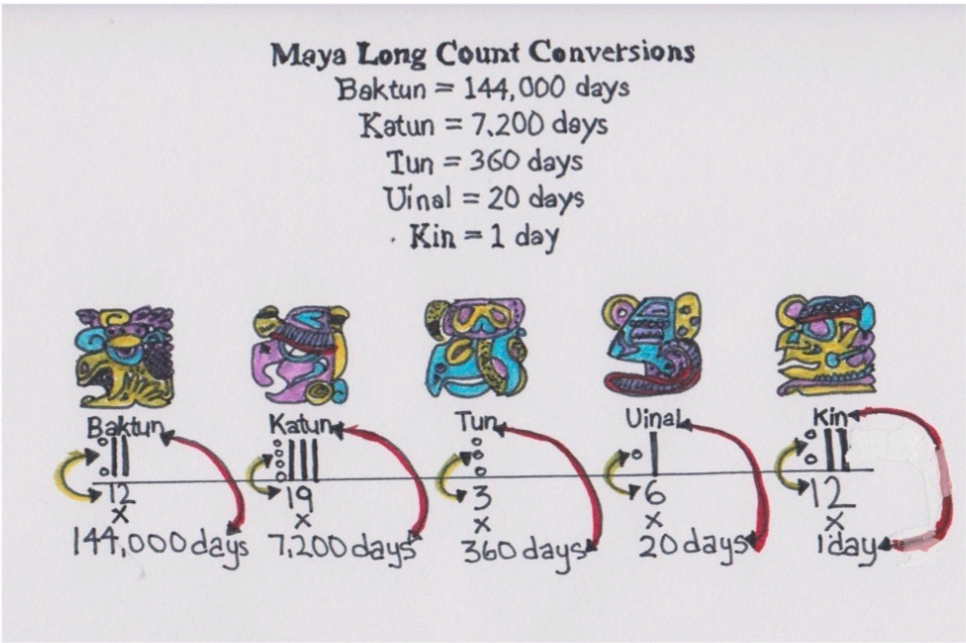
start of Cumku (the last day of Kayab)





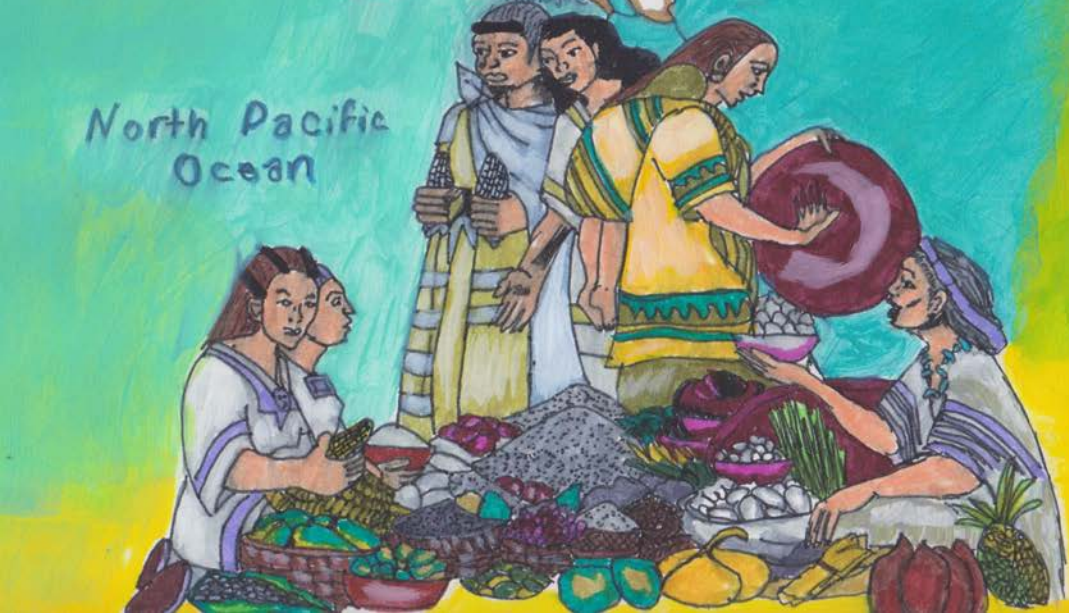
The solar calendar, also known as the Haab has 365 days made up of 18 months. Each month had 20 days, adding to a total of 360 days. The remaining five days at the end of the year are unlucky, dangerous times known as the Wayeb. Because of this, for the last five days the Maya would stay inside and avoid any activities<sup>7</sup>

In order to keep track of longer periods of time, the Mayans used the Long Count calendar. The Long Count counts all the days since the beginning, which the Mayans marked as August 11, 3114 B.C.<sup>8</sup> While numbers were shown through the use of sticks and stones, the Maya also depicted them by assigning faces of the Gods to each number. Because of this, each day had a meaning that was tied to the meaning of the God it was assigned. As such, the Maya believed the day determined the actions that they could or could not perform on any given particular day<sup>9</sup>





To this day, the indigneous Maya are still alive and well. They live in what is now known as modern day Guatemala, Honduras, El Salvador, Belize, and Mexico. Traditional practices such as weaving, traditional dress, and agriculture work continue to be used to celebrate Maya heritage each and every day.



## Endnotes

1. "The Maya World." - *Sun, Corn and the Calendar*, Smithsonian- National Museum of the American Indian Smithsonian Latino Center, [maya.nmai.si.edu/the-maya/maya-world](http://maya.nmai.si.edu/the-maya/maya-world). The Maya civilization inhabited and still inhabits what is known as modern day southern Mexico, Guatemala, Belize, northern parts of El Salvador, and west Honduras. Rather than adopting a system similar to a kingdom in which there is one king or centralized government, the Maya had a system more akin to city states. At the height of Maya civilization, also known as the classical period, the largest cities held populations of 50,000 to 100,000 people.
2. "Creation Story of the Maya." - *Sun, Corn and the Calendar*, Smithsonian- National Museum of the American Indian Smithsonian Latino Center, [maya.nmai.si.edu/the-maya/creation-story-maya](http://maya.nmai.si.edu/the-maya/creation-story-maya). Within the Smithsonian site it speaks of how six deities known as the Framer and the Shaper, Tepew and Quetzal Serpent, and Xpiyacoc and Xumucane helped Huracan create earth. They poured their energy to give earth its creativity, and separated sky from earth by planting a ceiba tree to make space for all life. The roots and branches of this tree stretched from the nine levels of the underworld and into the thirteen levels of the upper world. The planes of existence for the Maya were thought to be vertical. Babies who had died and those who were sacrificed in rituals went into the upper world and all others, even royalty, went to the underworld.
3. Aldana, Gerardo, et al., editors. *Archaeoastronomy and the Maya*. Oxbow Books, 2014. *JSTOR*, [www.jstor.org/stable/j.ctvh1dp92](http://www.jstor.org/stable/j.ctvh1dp92). One of the hardest sites to excavate of Maya territory has been that of the Maya lands in the Yucatan peninsula. Because this area is shrouded in hostile jungle vegetation, it's rare to find structures that are still in tact, let alone walls with decipherable preserved hieroglyphs and depictions on them. However, it is here that archeologists found remnants of what is believed to be the Maya's origin story. This in turn led researchers to ask surviving surrounding Maya villages of their interpretation of their origin story to see if it was in alignment with what was depicted on excavated structures in the lowlands. These stories later aligned with texts found that were kept under Spanish colonial rule who had recorded the Maya creation story.
4. *Mayan Economy- Discover How the Ancient Mayan Economy Flourished in the Classic Period*, [mayansandtikal.com/mayan-civilisation/mayan-economy-civilization/](http://mayansandtikal.com/mayan-civilisation/mayan-economy-civilization/). While the Maya did not have a concrete form of currency, trade generally took the form of exchanging goods that were considered valuable. Maize, fish, spices, handcrafted work, precious metals, tools, and cacao were all traded and valued differently. Cacao and seashells in particular were used in order to place value on a commodity. For example, a tomato was the equivalent to one cacao bean, a pumpkin at 4, a rabbit at 100, and a slave at 1000. The economy operated within the bounds of a social economy in which society was divided into commoners, craftsmen, and the nobility. The commoners generally worked in the agricultural sphere, craftsmen worked in positions that required skill in order to produce tools, weaponry, and handcrafted luxuries, and the nobility generally overlooked agricultural lands and the empire.

5. Aveni , Anthony. *Empires of Time: Calendars, Clocks, & Cultures* . University Press of Colorado; Rev and Rev EnglishNorth American Versionon, 2 Oct. 2002. The Maya had a vestigial system, also known as a base 20 system. This is indicated due to the fact that no combination of dots and bars (stones and sticks) ever exceed 20. It is believed that this system was set in place because according to documents found in Maya Stelae, they used their bodies to count the days. Rather than the way that we end our base ten system by counting our ten fingers, the Maya counted their ten fingers and their ten toes (it is believed that dots (which hold a value of one) represented the tips of fingers because they were used for tallying and a single horizontal finger (a bar) or clenched fist represented 5 days and held a value of 5. This number keeping system allowed for the Maya to calculate not only small numbers but to complete large and complex calculations as well.
6. Famsi. "Maya Codices - The Dresden Codex." *FAMSI*, [www.famsi.org/mayawriting/codices/dresden.html](http://www.famsi.org/mayawriting/codices/dresden.html). Each day was assigned a deity. For example, the number ten is depicted by a bare skull, also known as the image of death. When the digits go into doubles, images of the deities used to depict single digit numbers are merged. As a result of the symbolism behind their numbers, the Maya lived their lives in accordance to the meanings of the deities associated with numeral values under 20.
7. Aveni , Anthony. *Empires of Time: Calendars, Clocks, & Cultures* . University Press of Colorado; Rev and Rev EnglishNorth American Versionon, 2 Oct. 2002. What we call the Mayan calendar is actually a set of three interlocking calendars, the sacred calendar of 260 days called the Tzolkin, the solar calendar of 365 days known as the Haab, and a Long Count calendar of much longer time periods.
8. "Creation Story of the Maya." - *Sun, Corn and the Calendar*, Smithsonian- National Museum of the American Indian Smithsonian Latino Center, [maya.nmai.si.edu/the-maya/creation-story-maya](http://maya.nmai.si.edu/the-maya/creation-story-maya). The Tzolkin or sacred calendar consisted of 20 periods each with 13 days for a 260-day count. Each day had a number and a name, the numbers from 1 to 13 and 20 day names. When the 13 numbers were gone through, they began again, and the 20 day names continued. When the day names were gone through, they repeated, and the numbers continued up to 13. The cycles of 13 and 20 repeated until they came back to the first number, first name again in 260 days. The priests who kept the calendars used the Tzolkin to determine days for sowing and harvest, military triumphs, religious ceremonies and divination. Long Count calendar is cyclical as each period of time will begin again, but it is also linear. Because it is linear, it can take into account dates far in the future or in the past. The basic unit of this calendar is the tun, a year of 360 days, the basic Haab year without the five-day Wayeb. Long Count dates are expressed in five digits. The five digits represent a kin (day), uinal (month), tun (year), katun (20 years) and baktun (20 katuns).
9. The solar calendar or Haab has 365 days made up of 18 months of 20 days each, which adds up to 360 days. The remaining five days at the end of the year is an unlucky, dangerous time known as the Wayeb. Mayans stayed home and neglected all activities during this time to avoid disaster. In the Haab calendar, a day is represented by a number in the month, then the name of the month. There were 19 month names, plus Wayeb for the dreaded five-day month, making 20 month names.