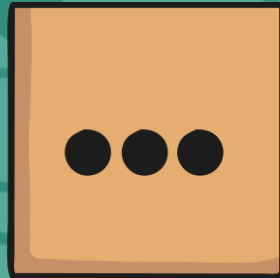


Maya Number System

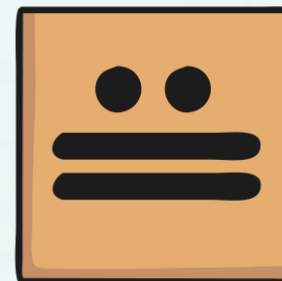
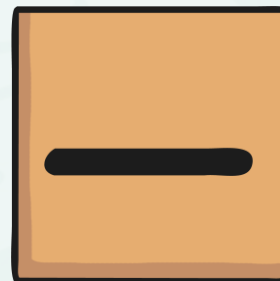
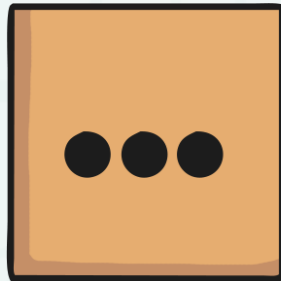


The Maya and Numbers

The Maya had a good understanding of numbers and they developed a complex number and counting system which was advanced for their time.

They were one of only two cultures in the world to develop the concept of zero and this allowed them to develop a place value system where a zero could act as a place holder in large numbers. This enabled the Maya people to distinguish between numbers like 23 and 203, where the placement of the zero determines the value of the digit 2 as 200. This is a very important concept which many civilisations did not understand until much later than the Maya.

The Maya people used symbols to represent their numbers. Let's have a look at how it worked.



Number Symbols



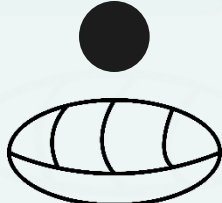
The Maya people used just three symbols in their number system. These are thought to represent items that the Maya people might have first used to count with such as pebbles, sticks and shells.

With your partner, look at the following Maya numbers. Can you work out what numbers the symbols represent and how the system works?

 $= 7$

 $= 18$

 $= 11$

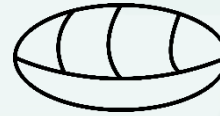
 $= 20$

Shells, Sticks and Pebbles



Questions

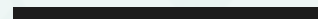
1. Did you figure it out?
2. What have you learnt about the way the numbers are written?
3. What other Maya numbers can you write?
4. How is the Maya number system similar and different to our own?



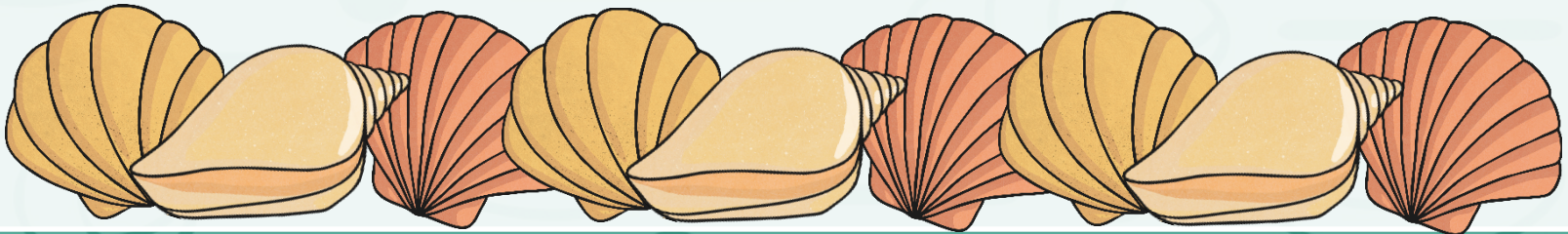
= 0



= 1



= 5























Maya Numbers

1	●
2	● ●
3	● ● ●
4	● ● ● ●
5	—
6	● —
7	● ● —
8	● ● ● —
9	● ● ● ● —
10	==

11	● ==
12	● ● ==
13	● ● ● ==
14	● ● ● ● ==
15	===
16	● ===
17	● ● ===
18	● ● ● ===
19	● ● ● ● ===

Maya Numbers

20		30	
21		31	
22		32	
23		33	
24		34	
25		35	
26		36	
27		37	
28		38	
29		39	

The Maya people used a base 20 number system, so after number 19 multiples of 20 were written above the bottom number. This is called a vigesimal positional number system.



Working it Out

Here are a couple of examples of how the system works.

$$\bullet \bullet = 2 \times 20$$

$$\underline{\bullet \bullet \bullet} = 8$$

$$40 + 8 = 48$$

Number of 20s		$8 \times 20 = 160$	167
Number of 1s and 5s		$= 7$	

Larger Numbers



Using the information you have learnt, can you work out what these larger numbers are?

$$\begin{array}{r} \bullet \bullet \\ 40 \\ \bullet \bullet \bullet \\ \text{= 58} \\ \text{= 18} \end{array}$$

$$\begin{array}{r} \text{= 200} \\ \bullet \bullet \bullet \\ \text{= 218} \\ \text{= 18} \end{array}$$

$$\begin{array}{r} \bullet \\ \text{= 320} \\ \bullet \bullet \bullet \\ \text{= 338} \\ \text{= 18} \end{array}$$

Maya Number System Activity Sheets



Use the information you have learnt about the Maya number system to help you work out the numbers on the **Maya Number System Activity Sheet**.

0-5080 Maya N

Read the Larger Maya Numbers Activity Sheet. Now can you

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0-19 Maya Number System

Can you work out these Maya numbers? Use the key to help you.

Key

- 0
- 1
- 5

Add up the value of each symbol.
 $1 + 1 = 2$

$5 + 5 + 5 = 15$

Then simply combine the two totals!
 $5 + 5 + 5 + 1 + 1 = ?$

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Number System

Can you work out these Maya numbers? Use the key to help you.

The Maya only counted up to 20. After that they would count in multiples of 20.

The symbols in the top row need to be added together and multiplied by 20:
 $(1+5) \times 20 = ?$

The bottom row simply needs to be added together:
 $1 + 1 + 5 + 5 = ?$

The total value of the symbols can be calculated by simply combining the two values together!
 $(6 \times 20) + (1 + 1 + 5 + 5) = ?$

Key

- 0
- 1
- 5

Number of 20s

Number of 1s and 5s

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