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Solar Eclipses in Ancient Greece

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Zach Coblens, Will Paige, Ryp Ring | Western Oregon University

Greek Culture
Solar eclipses are known for their beauty and almost twilight feel when witnessed in person. The sun is fully engulfed by the moon, leaving only a ring of what the sun used to be for only a moment.

To the average Joe this might seem like an amazing spectacle that they can’t wait to tell their grandchildren. But, there is more to this event than just a huge space rock blocking light from a star. Throughout the history of the planet many scientists and mathematicians have worked to decipher the exact timings for this event in the past and even in the future.

Eclipses in Culture and the Saros Cycle
Greek astronomy and mythology play into the study of the sun and moon as well. It was a very cultural belief to view the sun and moon as life and death, or to relate them to the gods. Before any science was involved with a solar eclipse, many kingdoms and civilizations viewed them as a symbol. Not just one symbol was put forth upon the phenomenon of a solar eclipse. Some of the symbols included peace, declaration of war, or even a disturbance in the natural order of the world. One of the most notable solar eclipses to ever take place was the total eclipse of the sun during the war between two Greek factions, the Lydians and the Medes, in 585 BCE. The factions viewed this twilight wonderland as a sign to finally make peace and end their hatred once and for all.

Before eclipses could be predicted, Greeks observed that eclipses occurred in patterns; that is, eclipses could be predicted. Over time, through observation, they eventually came up with the Saros Cycle.

The Saros Cycle is a very accurate calculation for determining the exact time of the next full solar eclipse. This method was used primarily by Greek mathematicians to design the Antikythera Machine. What it does is follow an uncommon resonance within each of the three orbital periods of the moon to determine that a repeat eclipse will occur every 223 lunar months. This wasn’t the first method in deciphering the mystery of a solar eclipse, but it was crafted from similar equations such as the 41-lunar month cycle and the 47 month lunar cycle.

Ancient Greek’s mathematical methods included this formula for the Saros Cycle:

\[ 223 \text{ Psyn} = 242 \text{ Pdrac} = 239 \text{ Panom} \]

It is defined as this: A prediction cycle that is a period when a whole number of synodic months is equal to a whole number of half draconites. When this is also close to a whole number of anomalistic months then the appearance of a repeat eclipse is very similar. Ancient Greeks stretched their equation farther than the basic 41 and 47 lunar cycles to determine a very advanced and precise prediction for each of the solar eclipses that will take place in the distant future.

Conclusion
The sun and the moon were very symbolic in early Greek culture. Through their observations, the Greeks were able to come up with the Saros cycle to predict solar eclipses. Once they developed that, they created an analog machine that could visually show the Saros cycle. We often hear about the creativity and ingenuity of the Greeks, their observation of solar eclipses show that succinctly.

Map of Antikythera