

The Temples at El Karnak

1



To ancient Egyptians, the sun god Re was the bringer of light, and in other incarnations, the creator of the universe. He is among the oldest of the gods that were created by Egyptians during the nearly 4000-year span of their civilization.

The magnificent temple at Karnak celebrates this unity through its enormous pillars, designed in harmony with the sun and stars over a period of nearly 2000 years.

Built by the Ancient Egyptians in several episodes of construction and enlargement from 2055 B.C to 395 A.D. It was originally surrounded by the famous city of Thebes, which was completely sacked in 667 B.C by the Assyrian ruler Ashurbanipal. Most of the original temple compound still lies under the city of Luxor and is inaccessible by archeologists. The major purpose of the temple complex at Luxor was to honor the god Amon-Re. The main function of the temple was for the Festival of Opet. A statue of Amon-Re would be carried in a solemn procession from the main temple compound, down the Avenue of the Sphinxes, and into Luxor

The earliest axis included the famous Great Hypostyle Hall built by Ramses II on an east to west alignment. Sir Norman Lockyer (1836-1920) proposed a midsummer sunset alignment of the Main Axis of the Great Temple of Amon-Re. By some accounts, the temple at Luxor may have no less than four well-defined alignment changes involving stars. Unlike solar alignments which can generally last for thousands of years intact, stellar alignments are much more critical because of the precession of the equinoxes, and last only a few hundred years. Lockyer's measurements showed several Karnak temples had been altered over the centuries to match the precessional changes in their aligned stars.



Education Standards Satisfied by This Activity

(See Benchmarks for Science Literacy, Project 2061, AAAS)

1c – The Scientific Enterprise

G6-8 “Important contributions to the advancement of science, mathematics and technology have been made by different kinds of people, in different cultures, at different times.

G9-12 “The early Egyptian, Greek, Chinese, Hindu and Arabic cultures are responsible for many scientific and mathematical ideas and technological innovations.

2a – Patterns and Relationships

G9-12 “Although mathematics began long ago in practical problems, it soon focused on abstractions from the material world, and then on even more abstract relationships among these abstractions.

3A - Technology and Science:

G6-8 “Engineers, architects and others who engage in design and technology use scientific knowledge to solve practical problems. But they usually have to take human values and limitations into account as well.

4B – The Earth

G6-8 “Because the Earth turns daily on an axis that is tilted relative to the plane of earth’s yearly orbit around the sun, sunlight falls more intensely on different parts of the Earth during the year. The difference in heating produces the planet’s seasons and weather patterns.

11B – Models

G3-5 “Geometric figures, diagrams, and maps can be used to represent objects, events and processes in the real world although such representations can never be exact in every detail.

Problem 1 - Based on the satellite photo and the compass circle in the upper right-hand corner, what is the azimuth angle of the main axis of the temple compound that runs from upper-right to lower-left in the image? Draw several parallel lines that represent this axis through the building compound.

Problem 2 - The table below gives the sunrise azimuth angles for the 21st day of each month of the year at the location of the Temple at Karnak. On which dates will the sunrise shine directly along the main axis of the temple?

Month	Azimuth	Month	Azimuth
January	114	July	64
February	106	August	71
March	94	September	83
April	81	October	97
May	70	November	109
June	63	December	115

Problem 1 - See below.



Problem 2 - Answer: During the time near the winter solstice, December 21, the azimuth angle of the rising sun is similar to the azimuth angle of the main axis of the temple, so near this date, sunlight from the rising sun will pass along the main corridor of the temple from the lower-right (southern entrance) to the top-left (northern exit).