

# Measuring the Great Pyramid

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**This clever method answered a really big question: How tall is the tallest building?**

That question troubled the Greek mathematician Thales of Miletus (my-LEE-tus) 2,600 years ago. He wanted to measure the largest pyramid in Egypt.

All the huge pyramids of Egypt are more than 4,000 years old. For thousands of years they were the tallest, widest buildings on Earth. The biggest pyramid, the Great Pyramid of Khufu (KOO-foo), was 481 feet tall. But Thales (THAY-leez) didn't know that—yet. Most of the story of Thales' life has been forgotten. But we do know that he traveled a lot, so he probably enjoyed meeting new people and seeing new places. We also know that Thales loved science, business, philosophy, and mathematics. Today, he is best remembered as the first of the great Greek philosophers and mathematicians.

Like many tourists, Thales wanted to know the height of the Great Pyramid. He couldn't find anyone to answer his question, so he set out to measure it himself. His method was so clever that people still talk about it.



Thales decided to discover the height of the pyramid by measuring *its shadow*. This was easier and safer than climbing to the top, because in Thales' time the Great Pyramid had a smooth stone covering. (Many centuries later, most of this covering and part of the top were removed to build other things.)

But Thales had a problem. When the Sun was near the horizon, the pyramid's shadow was long. The shadow shortened as the Sun rose in the sky. What time was the right time to measure the shadow? Thales used a stick to answer that question. He pushed it partway into the ground so that it stood up straight, and he measured the height of the stick.

He reasoned that when the length of the stick's shadow equaled the height of the stick, the height of the pyramid would equal the length of its shadow. Measuring the shadow would be like measuring the height, only easier.

Thales waited until the stick's shadow was as long as the stick was tall. At that special time, Thales measured the pyramid's shadow. And he had the answer to his question.

### **Finding New Heights**

See if Thales' method will work on a fence post, a bush, or anything that you can also measure directly.

You'll need a straight stick, a yardstick or tape measure, and a sunny day. Be sure that each object is on level ground and that no other shadows interfere. When the length of the stick's shadow is equal to its height, do the other objects' shadows also equal their heights?