

# SOLVING THE PYRAMID PUZZLE

## About the Cover

How many faces, edges, and sides does the pyramid have?

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# SOLVING THE PYRAMID PUZZLE

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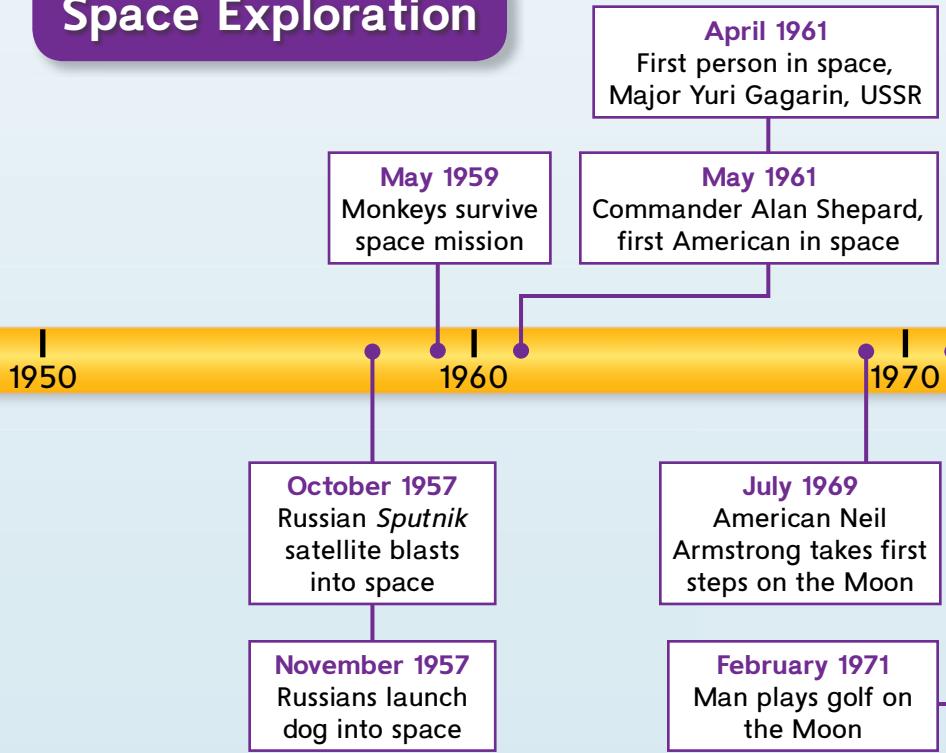
# Our Mysterious Planet

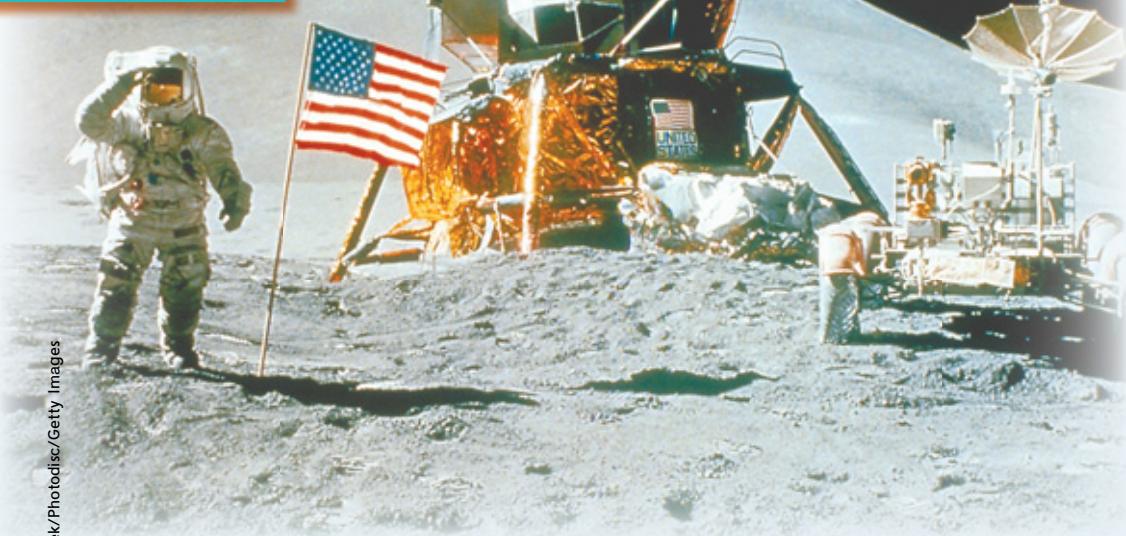
Sometimes it seems that there are few mysteries left in the world. Humans have walked on the Moon. Almost every inch of Earth has been mapped and explored.

But mysteries still remain. For example, there are still many questions about the ancient pyramids. Scientists have used many methods to look for the answers. No matter how hard they try, some questions still remain.



## Space Exploration





April 2001

First space tourist is  
billionaire businessman  
Dennis Tito

1980

1990

2000

January 2004

NASA rover looks for  
water on Mars



What does each interval of years on the timeline represent? How would the timeline change if the intervals were in 100s? 1,000s?

# Giza Pyramids

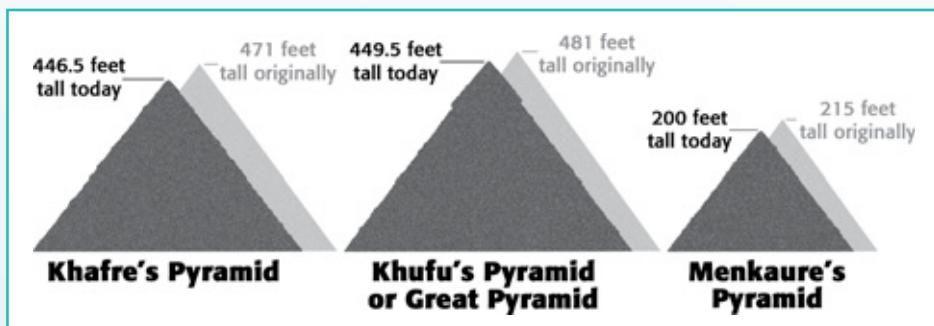
Egypt's Giza (GEE zuh) pyramids are some of the most popular sites in history. As many as 750,000 tourists visit the pyramids each month.

Experts believe the pyramids were built as **tombs** for famous kings. The pyramids were built to last long after the kings had died.



There is some disagreement about the age of the pyramids. Khufu's (KYOO fyoo) Pyramid, or the Great Pyramid, is the oldest and biggest. Scientists believe that the pyramid was built between 2589 and 2566 B.C.

Khafre's (KAH frah) and Menkaure's (mehn KYOO ray) pyramids were probably built during the next 100 years for Khufu's son and grandson.



# Building the Giza Pyramids

Experts cannot believe how precisely the pyramids were built. There was no electricity. There were no heavy machines. The big pyramids were all built by hand.

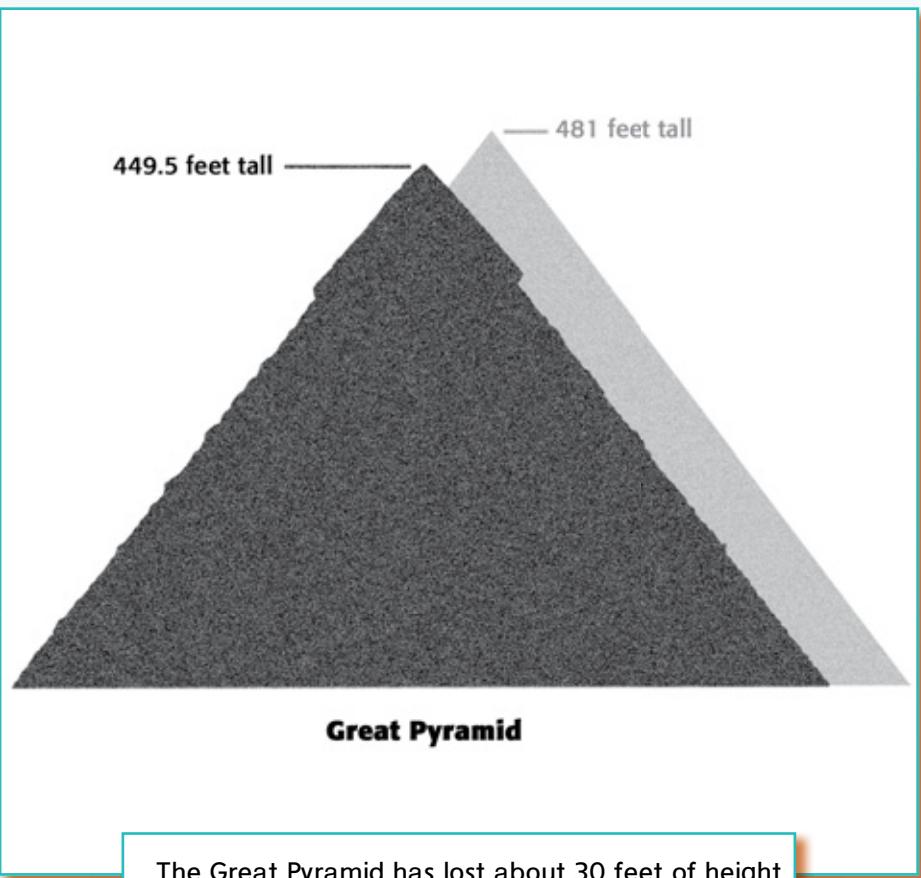


The base of each pyramid is almost a perfect square. A square has four right angles. The angles of the Great Pyramid are almost exactly 90 degrees. Keep in mind that the base of the pyramid is 756 feet long on each side!



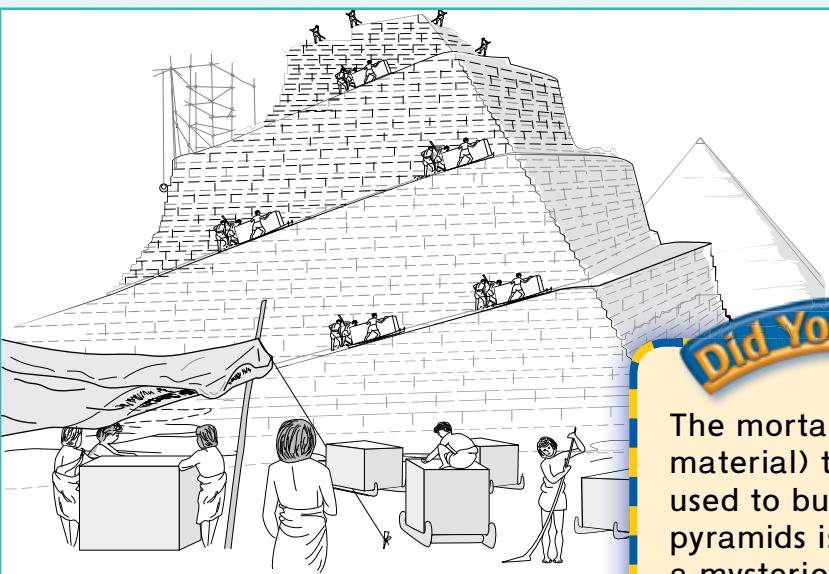
When it was finished, the Great Pyramid was 481 feet tall. This is almost as tall as a 50-story building. It was the tallest building in the world for more than 4,000 years.

Today, the Great Pyramid is  $449\frac{1}{2}$  feet tall. Over time, about 31 feet of stone has crumbled from the point on top.



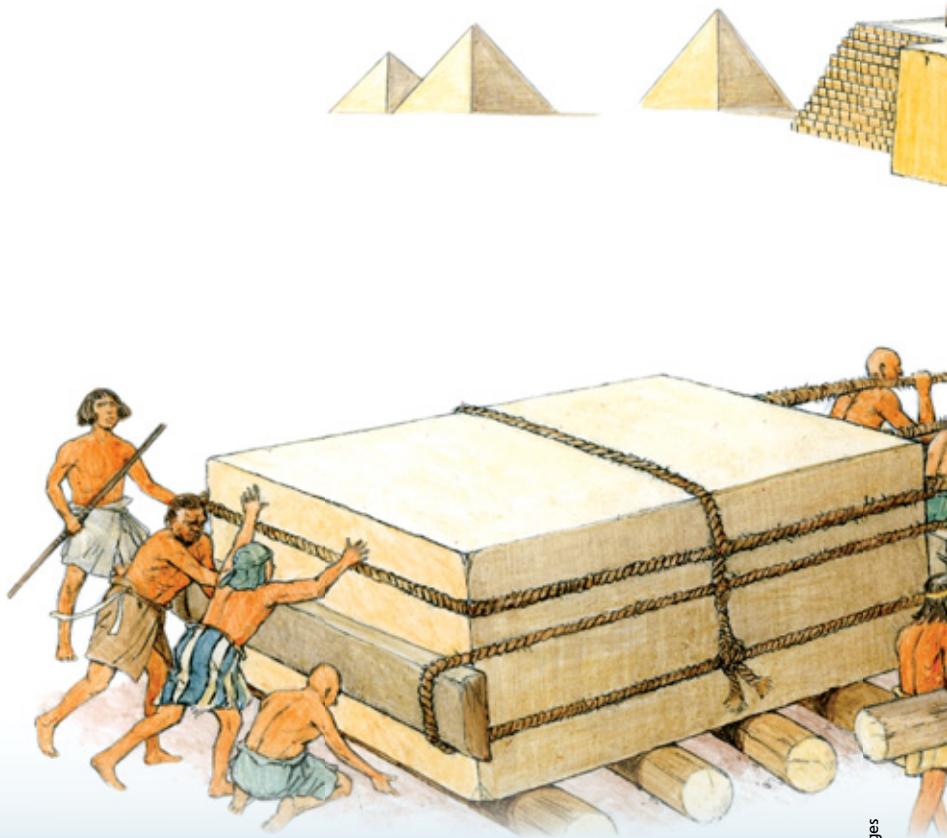
The Great Pyramid has lost about 30 feet of height. Thirty feet is equal to the height of a three-story building.

The pyramids were built of huge stone blocks. A block of average size weighed  $2\frac{1}{2}$  tons. A block was equal to the weight of  $1\frac{1}{2}$  cars. Imagine moving the 2,300,000 blocks needed to build the Great Pyramid!



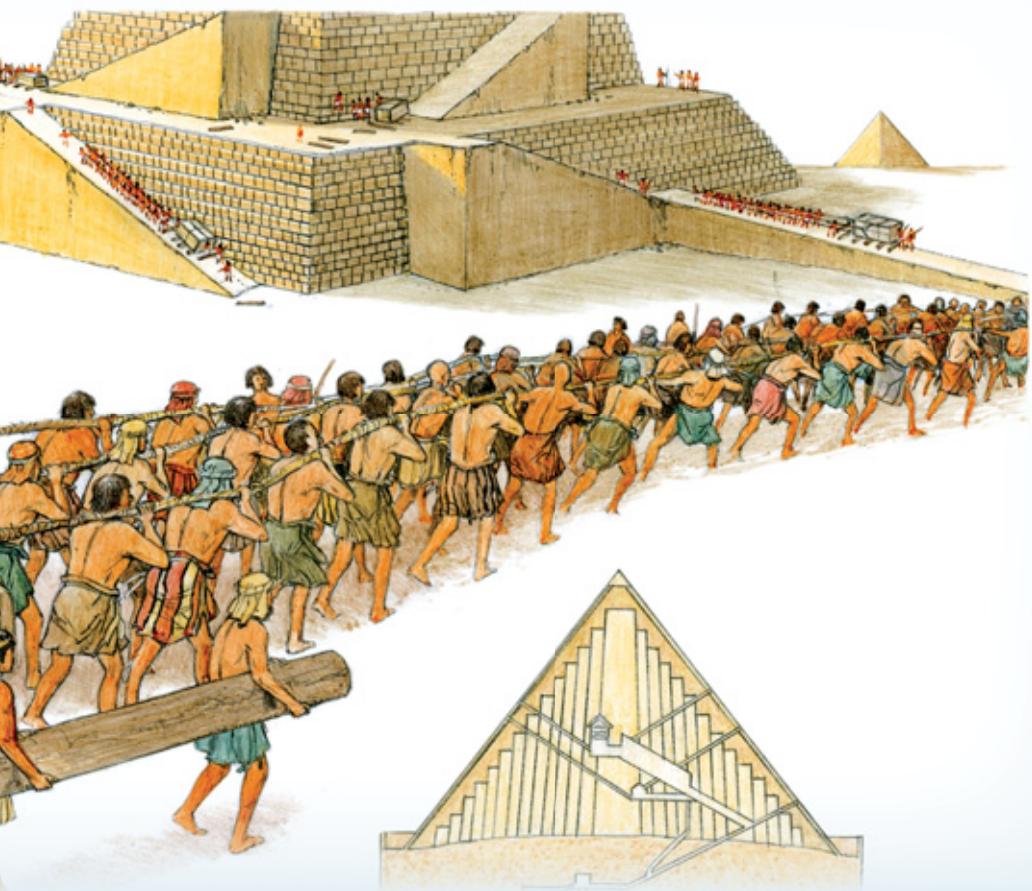
### Did You Know?

The mortar (glue-like material) that was used to build the pyramids is made from a mysterious substance that scientists still do not know how to make.



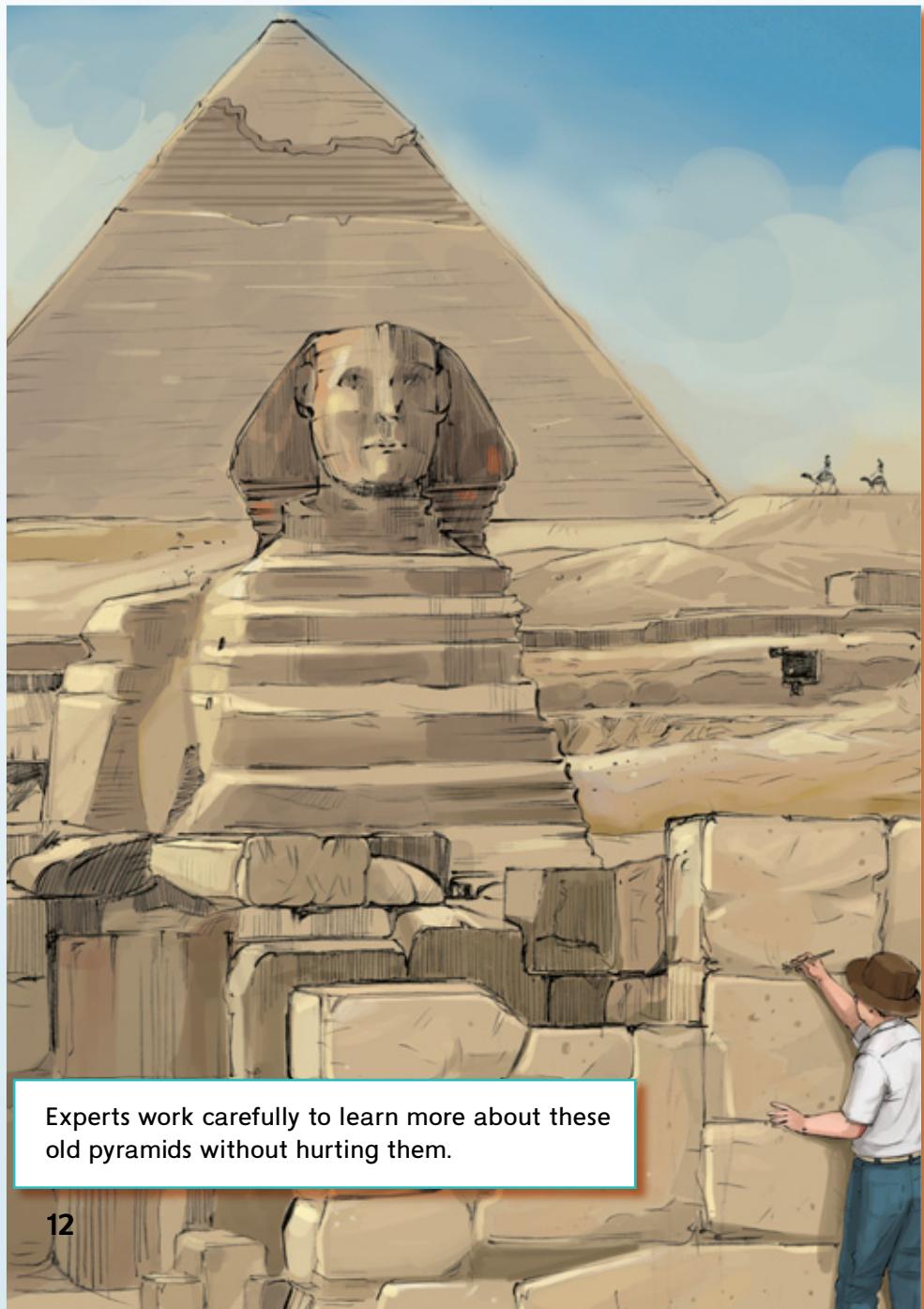
The building blocks may have been moved with ramps, pulleys, and levers.

People have tried similar experiments. They wanted to see how long it would take to move a stack of blocks the same size as the ones used in the pyramids.



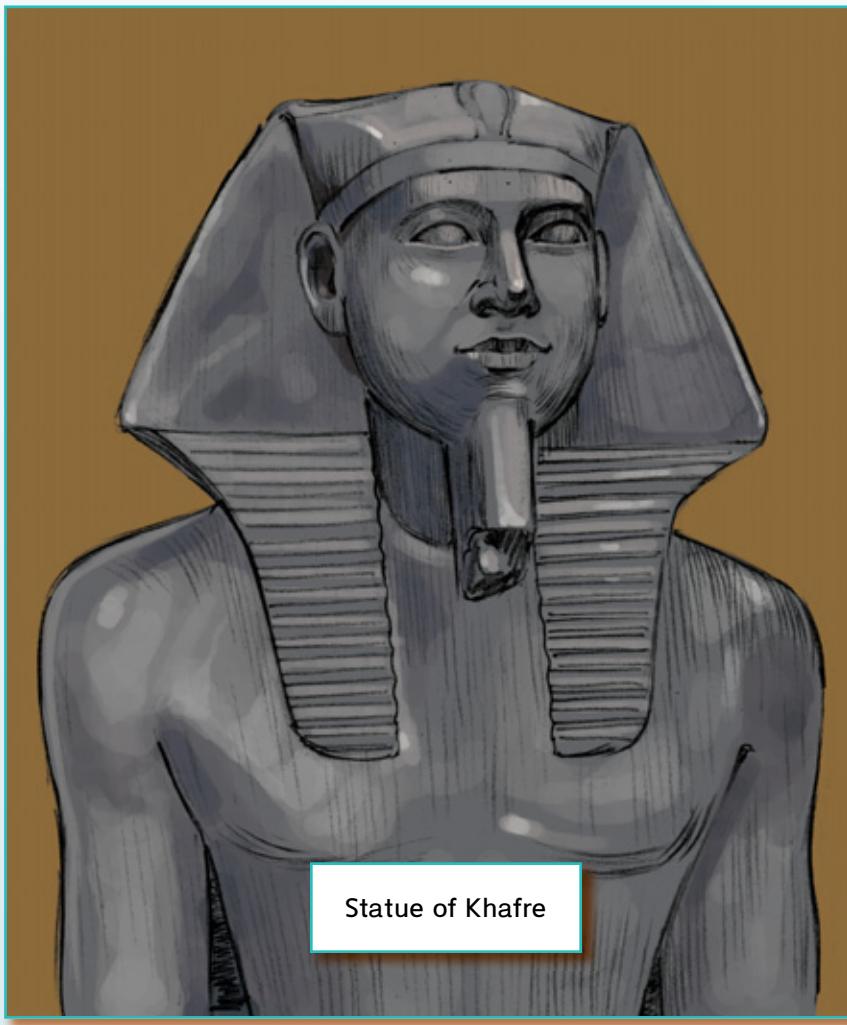
These experiments helped estimate how many people worked on a pyramid. Scientists believe that it took as many as 20,000 to 30,000 people to build these big pyramids.

These experiments also helped to find how long it might take to build the pyramids. It probably took about 20 years to finish each pyramid. There is no way to know if the estimates are right or wrong.

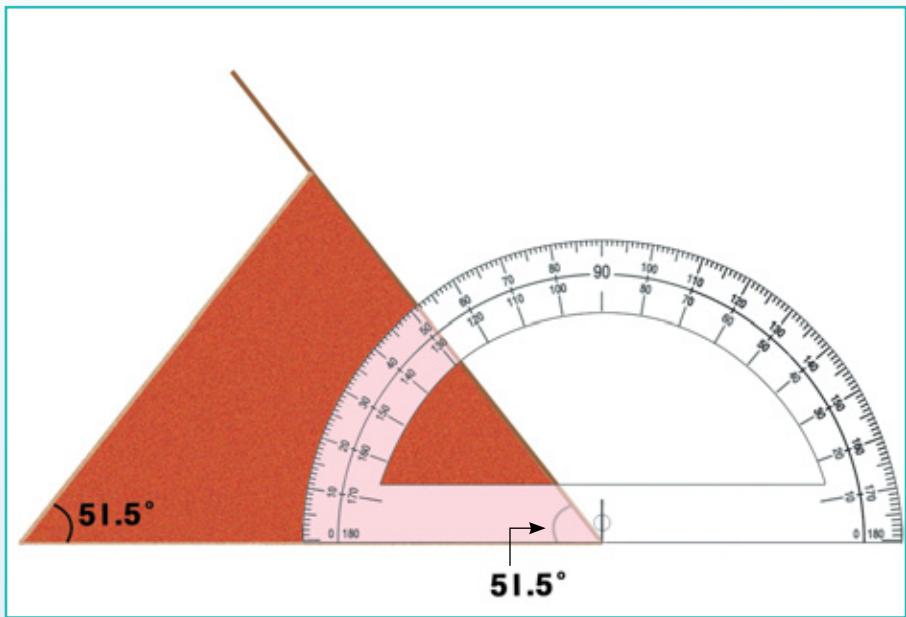


Experts work carefully to learn more about these old pyramids without hurting them.

People believed that the pyramid workers were slaves. Today, experts think that some workers were paid for their work. These workers built something big and lasting for their king and their country.



Each face of the Great Pyramid was built at an angle of  $51.5^\circ$  degrees. The builders were careful that the angle did not change as the pyramid was built taller. If the angle changed, the four sides would not meet at the top.



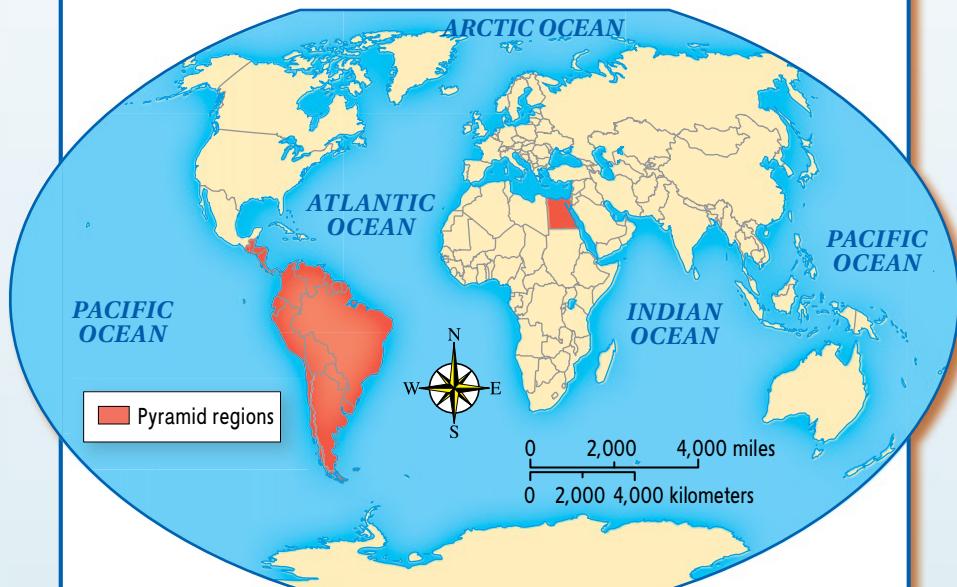
### Did You Know?

Architects believe that the angles of the pyramid's faces were measured by running rope from the outer corners up to the planned peak to make sure the stones were positioned correctly.

# More Pyramids

Egypt is not the only place in the world where you can find pyramids. There are more pyramids in Central and South America than there are in Egypt.

## Pyramids in the World



## Cholula, Mexico



The largest pyramid in the world is in Mexico. The base of this pyramid is a square with sides of 1,476 feet. Its height is 217 feet. It is not as tall as the Great Pyramid of Giza, but its volume is almost  $\frac{1}{3}$  greater. The Great Pyramid of Cholula (choh LOOH lah) is also famous for being the largest **monument** ever built.



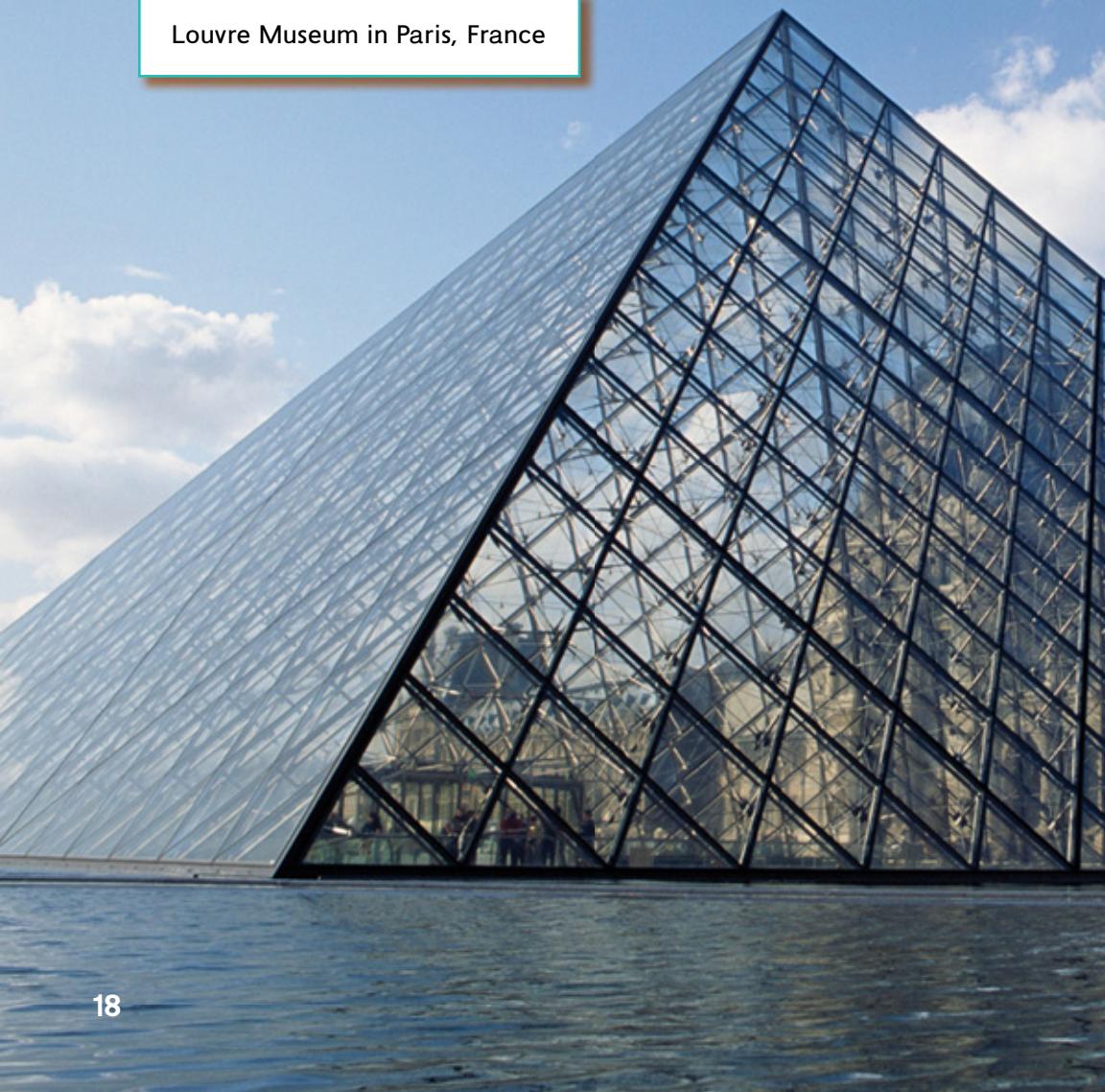
The Cholula pyramid was built slowly. Workers built the pyramid over 1,700 years.

The Cholula pyramid is also different because it has a flat top, not a pointed top. Long ago, a **temple** sat on the top of the pyramid.

# Modern Pyramids

Today pyramids are still built. In Paris, France, a glass pyramid is an entrance to the Louvre (LOOHV) Museum. It stands 70 feet tall, and the sides of its square base are 115 feet in length. It is made of 603 rhombus-shaped glass panes and 70 triangular glass panes.

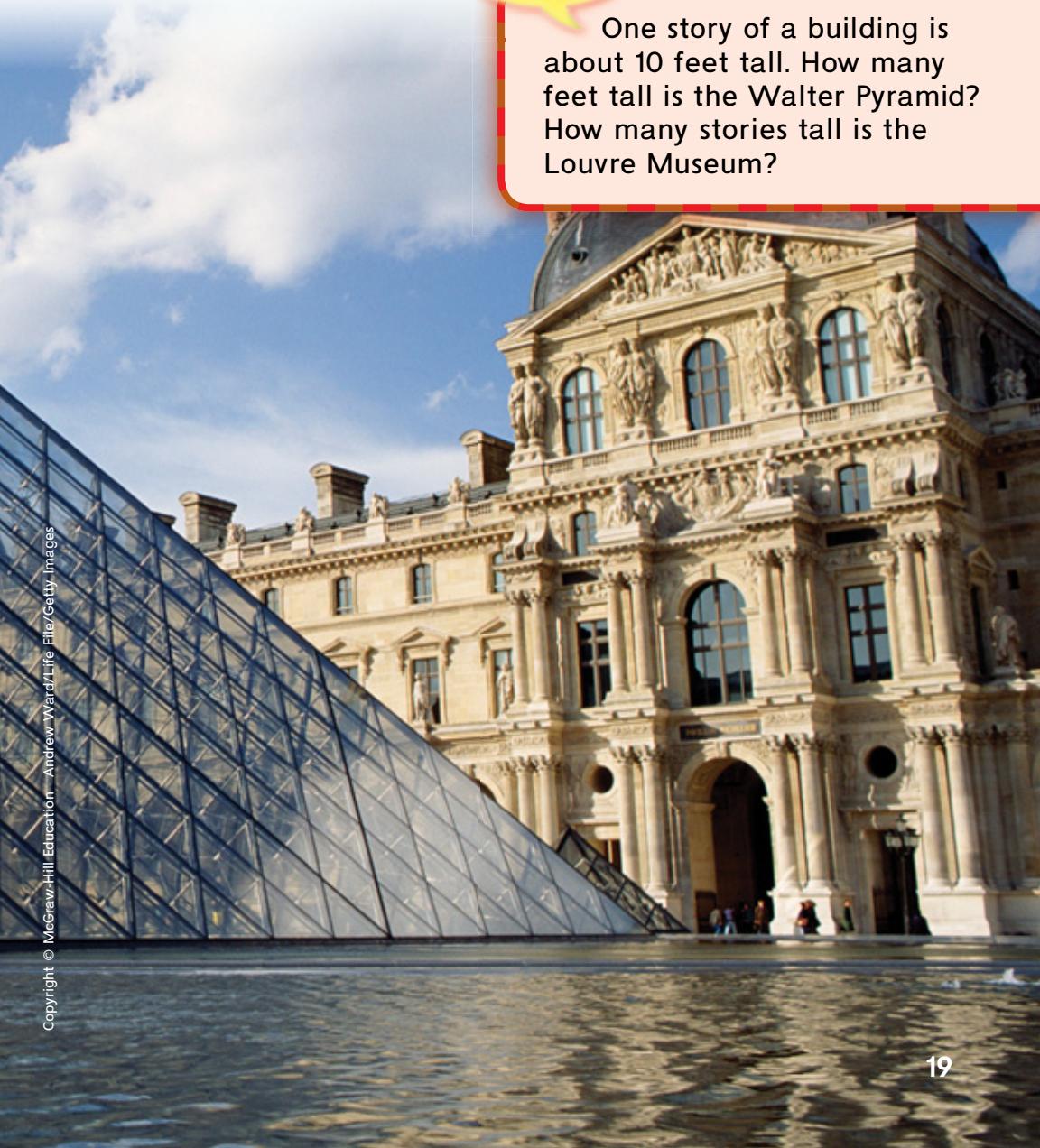
Louvre Museum in Paris, France



California is home to two pyramids. The Walter Pyramid is in Long Beach, CA. The shiny blue building is 18 stories tall. It was built as a sports arena for Long Beach State University.

**TALK  
ABOUT IT**

One story of a building is about 10 feet tall. How many feet tall is the Walter Pyramid? How many stories tall is the Louvre Museum?



The Transamerica Building is a famous San Francisco building. It looks like a tall, thin spike.

It is 853 feet tall. The sides of the building's square base measure 152 feet in length.



# Pyramid Secrets

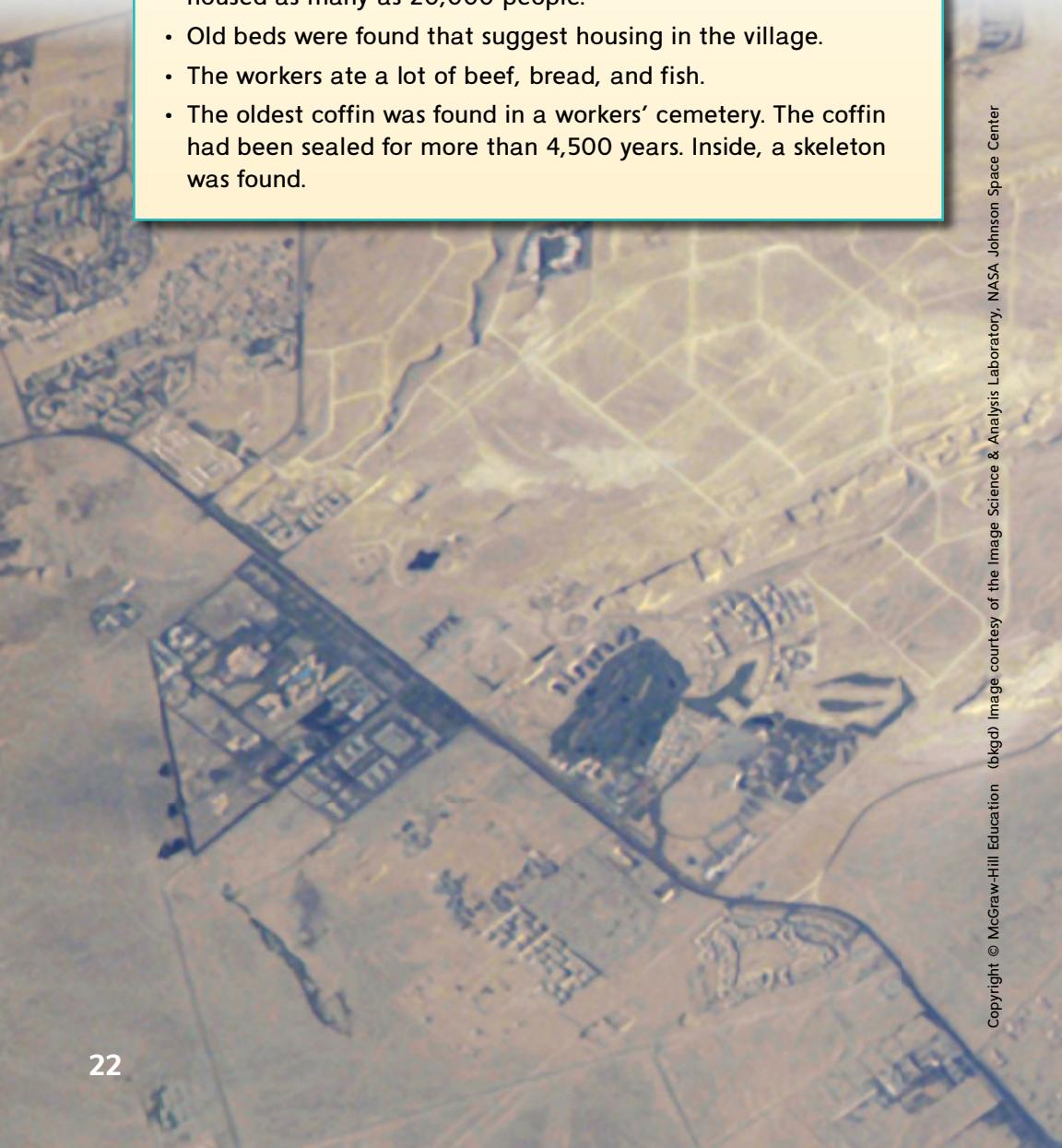
The mysteries of the old pyramids may never be solved. Scientists keep studying these amazing structures and are learning more about the **cultures** that built them.



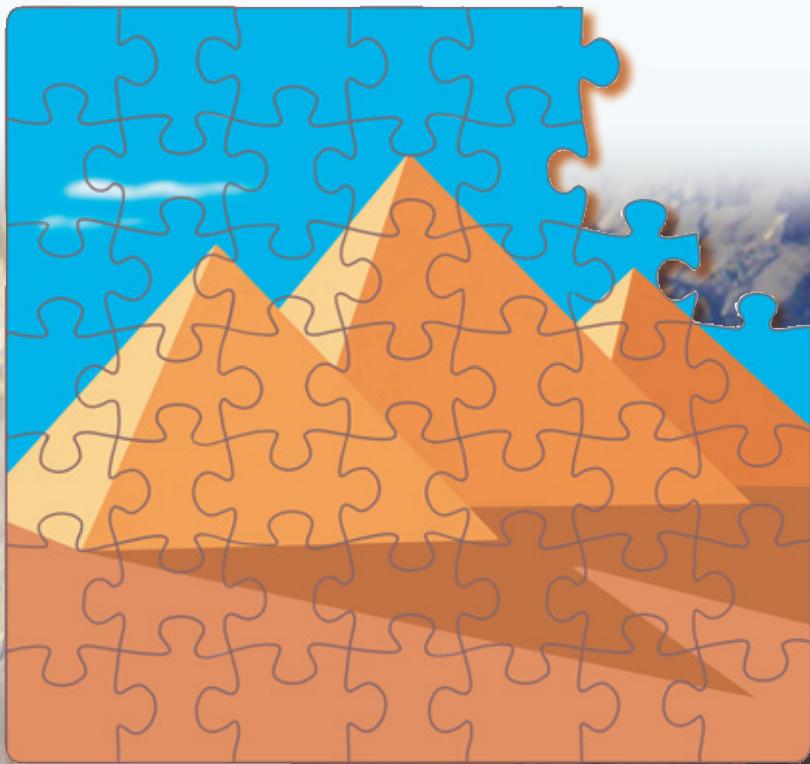
Technology keeps getting better too. Cameras and tiny robots let scientists see inside passages hidden deep in the pyramids.

## Recent Discoveries

- In Egypt, a workers' village has been found that may have housed as many as 20,000 people.
- Old beds were found that suggest housing in the village.
- The workers ate a lot of beef, bread, and fish.
- The oldest coffin was found in a workers' cemetery. The coffin had been sealed for more than 4,500 years. Inside, a skeleton was found.



Each piece of information is a clue. Would you like to be a part of the team that solves the puzzle of the pyramids?



Picture of the Giza Pyramids taken from space.



# Glossary

## culture

The beliefs, customs, and social behavior of a particular group of people. *(page 21)*

## lever

A bar that moves about a point and is used to move or lift a load. *(page 10)*

## monument

A site or structure that is a tribute to a person, group of people, or an event. *(page 16)*

## pulley

A tool made up of a rotating wheel and a rope or chain that is used to move heavy objects. *(page 10)*

## temple

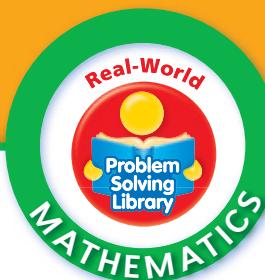
A building for worship. *(page 17)*

## tomb

A burial place. *(page 4)*

## Real-World Problem Solving

1. Look at page 3. The first space tourist went into space in 2001. How many years before that did the first American go to space? [Section 1]
2. Look at page 5. Which pyramid has had the greatest decrease in height? About how many yards shorter is the pyramid today? [Section 2]
3. Look at page 7. The Great Pyramid has a square base that is 756 feet long on one side. What is the perimeter of the base in feet and yards? Explain your work. [Section 3]
4. Look at page 9. The pyramid has 2,300,000 blocks. How many cars would it take to weigh half as much as the pyramid? Explain. [Section 3]
5. Look at page 16. The Great Pyramid of Cholula has a square base with sides that measure 1,476 feet. What is the perimeter of this pyramid? How much longer is the perimeter of this pyramid's base than the perimeter of the base of the Great Pyramid of Giza? [Section 4]
6. Look at page 19. The base of the Walter Pyramid has sides 345 feet long. How would you find the area of the base? [Section 5]

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