Pyramids

Leader

Create three dimensional geometric figures to explore the relationships between size, perimeter and area.

You will need:

- ❑ Scissors
- ❑ Pyramid patterns (see Materials Page)
- ❑ Tape

Do this:

- Cut out the patterns drawn on the graph paper. Fold each one on the broken lines and use a small piece of tape to hold the sides together.
- If each side of each square of the graph paper is one centimeter (1cm) in length, for the base of each of your pyramid:
  a. find the length of the sides (in centimeters)
  b. find the distance around the base (perimeter) in centimeters. (The square on which a pyramid rests is called its base.)
  c. examine the base of each pyramid. Find the number of square centimeters (cm^2) which cover the base of each pyramid.

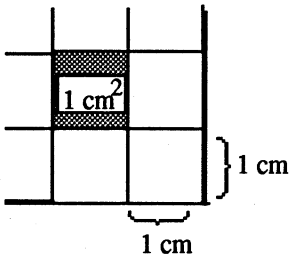


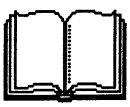
Figure 1

- Relevant facts to discuss with your students:

1. African mathematicians —4500 years ago—guided the construction of the pyramids. In fact, fundamental concepts in geometry, arithmetic, algebra, and trigonometry are discussed and used in recently translated mathematical papyri, which served as books in ancient Egypt.

2. The pyramids of Egypt are huge structures with a square base and four triangular sides meeting at the vertex or top. The greatest of these man-made mountains is the Great Pyramid of Khufu (or Cheops) located at Gizeh. Its 2,300,000 stone blocks were cut to a mathematical precision of .01 or 1/100 of an inch.

3. Modern scientists have no satisfactory explanation for how ancient African engineers so efficiently quarried, cut, transported and lifted into place, these huge stone blocks weighing from 2.5 tons to 70 tons each.

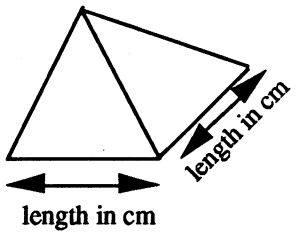


"The Pyramids: Ancient Showcase of African Science and Technology" by Beatrice Lumpkin in *Blacks in Science: Ancient and Modern*; I. Vansertimas, editor; Transaction Books, 1983.

Student_____

Do this:

- Cut out, fold and tape the patterns to form pyramids.
- For the base of each pyramid, find the length of the sides, the perimeter and the area.
- Arrange the pyramids by size and record your data on this chart, starting with your smallest pyramid.



Which Figure?	MEASUREMENTS OF THE PYRAMID'S BASE		
	Length of 1 side of base (cm)	Perimeter of Base (cm)	Area of Base sq. cm (cm^2)

1. What is the relationship between the length of a side and the perimeter of a pyramid's square base?_____

2. What is the relationship between the length of a side and the area of a pyramid's square base?_____

- Math Power Challenge:
  The base of the Great Pyramid of Khufu and Gizeh, Egypt has a perimeter of 3023.13 feet. If one foot = 30.48cm, what is the perimeter in centimeters?
  If 100 centimeters = 1 meter, what is the perimeter in meters?

 WHAT I FOUND

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