

Inquiry lesson plan for Thales

(Geometry)

Based on mathematician book

“The Parrot's Theorem by Denis Guedj”

Chapter 3 page 60-68

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Introduction

Students are aware of the achievements of the great ancient Greek mathematicians and apply their mathematical knowledge of the revival of the historical method of calculating the height of the pyramid of Cheops by Thales.

Questions:

- What do you know about Thales?
- See the follow videos

<https://youtu.be/YHboJiVmYWE>

- Discuss with your classmates which of presented geometry concepts are you know?
- Write a list of basic theorems in geometry based to Thales.

Answer:

- 1) *The circle is separated from its diameter into two sections of equal area.*
- 2) *The vertical angles are equal.*
- 3) *Each isosceles triangle has its base angles equal.*
- 4) *Equality criterion of triangles: Two triangles are equal when they have one side equal and the angles adjacent to that side are equal.*
- 5) *Any corner recorded in a semicircle is correct.*
- 6) *If two lines ε and ε are intersected by three or more parallel ones, then the straight line defined in line ε is proportional to the corresponding segments of e contained between the same parallel.*

Making design activities for preparation calculate the height of pyramid

Thales Theorem

Teachers' notes

The main objective is to understand the meaning of the proportion of corresponding straight lines defined on two intersecting three at least parallel lines so that students become able to formulate the Thalia theorem.

In addition to understanding and applying the inverse of Thales' Theorem as a criterion of parallelism of 3 or more lines.

Expansion of Thales' theorem in the case of the similarity of the triangles

Teachers' notes

- *Reminder of the definition of the similarity of two polygons.*
- *Two triangles are the same when they have two angles equal to one or the respective sides of the triangles.*
- *Students apply Thale's theorem in the case of parallel triangle side, identify and prove proportional relations between the sides of the two triangles formed.*
- *This particular phase of exploratory learning is very basic for the hypothesis modeling in the method of calculating the heap pyramid height*

[Activity](#)

Inquiry phase

- Due to the similarity of rectangular triangles, there is a constant relationship between a height of an object and its shadow and the height of the next object and its shadow. In this case you use the equal proportions between the height of an object and its shadow and height and your shadow.
$$H_o / S_o = H_\psi / S_\psi$$
- In addition, students should think that the length of the shadow of the pyramid ("So") is "a fantastic length of its shadow". The length of its actual shadow results from the deduction of the DB = 1/2 of the length of its base.

[Calculate the height of pyramid](#)

Video reviewing the method

<https://youtu.be/0P1Nc1t8vWg>



Analysis

- The area and volume of the pyramid of Cheops
- 1) If two triangles have equal bases to formulate the ratio given by their area ratio.
 - 2) If two triangles are equal in height to formulate the relation given by the ratio of their area.
 - 3) Based on the definition of two similar triangles with a similarity ratio λ to formulate the relation that applies to the ratio of their area.

