

Pythagorean Theorem

Activity Description

In this Pythagorean Theorem investigation activity, K4 - K8 pupils explore the relationships between the sides of a right triangle. They work in groups to draw several right triangles on the Pythagore instrument within FizziQ Junior, measure the lengths of the sides and calculate the squares of these lengths. By observing and discussing the relationships between the squares of the sides, students discover for themselves that the sum of the squares of the sides adjacent to the right angle is equal to the square of the hypotenuse. The activity continues with a discussion of the Pythagorean theorem, its practical applications and other situations where it might be useful. This investigation session allows students to discover the Pythagorean theorem independently, encouraging them to observe, analyze and discuss the relationships between the sides of a right triangle.

Type of activity

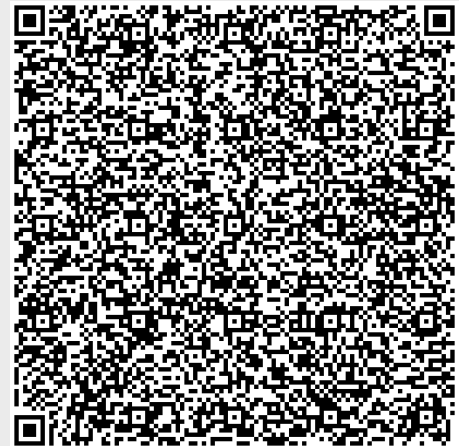
Math

Materiel

FizziQ Junior on a smartphone or tablet

Features of FizziQ Jr

The instrument Pythagore
Experiment notebook (text and photo)



Instructions:

- Introduce students to the concept of a right triangle without mentioning the Pythagorean theorem. Divide students into groups of 3 to 4.
- Ask them which FizziQ Junior instrument they can use to measure the side lengths of a triangle. Let them familiarize themselves with the tool.
- Have students draw several right triangles, using different lengths for the sides adjacent to the right angle. They add these triangles to the workbook.
- For each triangle, students should measure and record the lengths of the three sides (a , b , and c) and calculate the squares of these lengths (a^2 , b^2 , and c^2).
- Ask students to observe if they find a particular relationship between the squares on the sides of each right triangle.
- Let the students discuss and share their observations with each other, to finally discover that the sum of the squares of the two sides adjacent to the right angle ($a^2 + b^2$) is equal to the square of the hypotenuse (c^2).
- Introduce the Pythagorean theorem and explain how it describes the relationship they discovered. Discuss its practical applications in daily life and in various fields.
- Ask students to think of other situations where the Pythagorean theorem might be useful and to share their ideas with the class. Encourage students to think about the importance of understanding these variations for various applications, such as the design of energy-efficient homes or understanding climate variations.

Scientific lighting

The Pythagorean theorem is a fundamental principle of Euclidean geometry that concerns right triangles. It states that in a right triangle, the sum of the squares of the lengths of the two sides adjacent to the right angle (the two shorter sides) is equal to the square of the length of the hypotenuse (the longer side, opposite at the right angle). Mathematically, this is expressed by the formula:

$$a^2 + b^2 = c^2$$

where a and b are the lengths of the two sides adjacent to the right angle, and c is the length of the hypotenuse.

The Pythagorean theorem also has an interesting converse which is that if a triangle is such that the square of its two sides is equal to the square of another side, then this triangle is right-angled.

The Pythagorean theorem is named after the Greek mathematician Pythagoras, who is said to have lived between 570 and 495 BC. However, historical evidence suggests that the theorem was already known and used by other civilizations long before Pythagoras, notably by Babylonians and Egyptians. It is therefore possible that Pythagoras was not the first to discover this theorem, but that he contributed to its popularization and development in ancient Greece.

The Pythagorean theorem is widely used in mathematics, physics and in various practical applications, such as measuring distances, navigation, construction and architecture.

Security

Students should be careful when using their tablets in class. They shouldn't get distracted, drop the tablet on the floor, or get water on it. Tablets are fragile objects.

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