

## The sum of the angles of geometric figures

### Activity Description

This investigative activity is designed for K4 - K8 pupils to help them discover and understand the properties of the angles in triangles and squares. They use different shapes of triangles and squares drawn on the Pythagoras tool of FizziQ Junior and study the sum of the angles of those geometric figures. The class can be extended to the analysis of more complex polygons.

This session allows students to strengthen their geometry skills by exploring the properties of angles in triangles and squares. By working together, students develop their abilities to observe, analyze and discuss mathematical concepts. This activity also promotes critical thinking and problem solving by guiding students through a process of inquiry and discovery.

#### Type of activity

Math

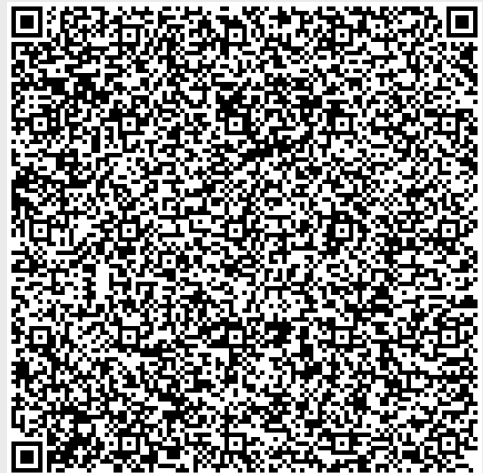
#### Materiel

FizziQ Junior on a smartphone or tablet

#### Features of FizziQ Jr

Pythagore's instrument

Experiment notebook (text and photo)



## Instructions:

- Introduce students to the concept of an angle in a geometric figure and describe the purpose of the lesson. Divide the students into groups of 2 to 3, each group equipped with a tablet on which FizziQ Junior is installed.
- 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 triangles and then display the angles by pressing the protractor. They add these triangles to the workbook.
- For each triangle, the students must add the angles and write it down in their experiment notebook.
- Ask students to observe if they find a particular relationship between the sum of the angles of each triangle. Share with the rest of the class the different results found.
- Let the students discuss and share their observations with each other, to finally discover that the sum of the angles of a triangle is equal to 180 degrees
- Discuss its practical applications in daily life and in various fields.
- Repeat the exercise with squares. Students will find a sum of 180 degrees.
- Can this rule be extended to all polygons with only four sides?
- Point out that a square can be broken down into two triangles, each of which has an angle sum of 180 degrees. Can they deduce a rule for the sum of the angles of the square?
- Students can investigate polygons with more than four sides, what hypothesis can they make? How to explain this rule?

## Scientific background

Here are some key understandings for teachers:

**Sum of the angles of a triangle:** The sum of the interior angles of a triangle is always equal to 180 degrees. This property is true for all types of triangles (equilateral, isosceles, rectangle and scalene). The geometric explanation of this property is related to the fact that the sum of the angles of a triangle is equal to the sum of the angles of a half-turn (180 degrees). This property is fundamental in geometry and can be used to solve many problems involving triangles.

**Sum of the angles of a square:** The sum of the interior angles of a square is always equal to 360 degrees. A square being a quadrilateral, it shares this property with other quadrilaterals, such as rectangles, rhombuses and parallelograms. The sum of the angles of a quadrilateral is equal to the sum of the angles of two triangles ( $2 \times 180$  degrees = 360 degrees).

**Sum of the angles of a polygon:** The sum of the interior angles of a polygon depends on the number of sides ( $n$ ) it has. The sum of the interior angles of a polygon can be calculated using the following formula:

Sum of interior angles =  $(n - 2) \times 180^\circ$

where  $n$  is the number of sides of the polygon.

This formula is based on the fact that a polygon can be divided into  $(n - 2)$  non-overlapping triangles, and the sum of the interior angles of each triangle is  $180^\circ$ . By multiplying the number of triangles by  $180^\circ$ , you get the sum of the interior angles of the polygon.

## 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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