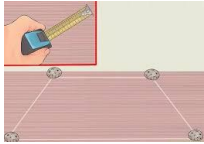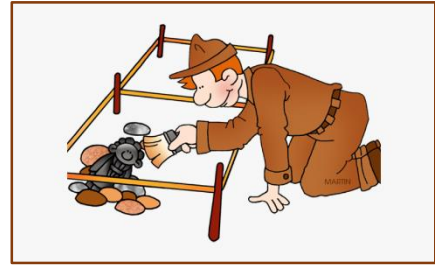# THE SQUARE METER PROJECT

Units of length and units of area.

Same area – different perimeter.

You need: a tool for measuring (tailor´s measure, ruler, measuring tape...), recyclable paper (newspaper), scissors, glue (stick) or adhesive tape, pencil, chalk, squared paper (grid), and appetite for exploration.

Nitra is one of the eldest towns in Slovakia. It was founded on seven hills like ancient Rome and today it is the paradise for archeologists because there are six significant archeological localities. They testify to the development of settlements and life in Nitra and its surroundings a long time ago.

While building modern contemporary buildings, construction workers uncovered different precious objects of archeological interest. They uncovered habitations and sepultures from prehistory to medieval, from 5500 B.C to the 11th century.

Task / Question: How can archeologists define research areas of 12 m²? They can make rectangles only. What is the length of fencing?

JOIN US and EXPLORE new terms and relations in the geometry of planar shapes.

1. **Homework:**
   Make your own square meter! How to do it?
   Put together old newspaper, leaflets, or used paper sheets. By gradual gluing create a square with the 1 m side. You can use a ruler or measuring tape. Then fold your square meter and bring it to school.
   .

1 m²
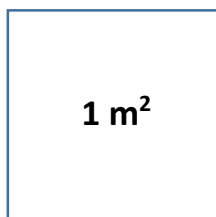
a = 1 m

2. On the sidewalk or the schoolyard **mark 1 square meter** (calk with the chalk), then guess how many of your classmates fit in:
   a) standing?
   b) sitting?
   c) lying?

Number of pupils	Guess	Reality	Difference
Standing			
Sitting			
Lying			

3. Work in groups and start defining/marking archeological research area of 12 m^2.
   Use **your „square meters"**. Place them to create different rectangles. Think of different solutions and draw them into the grid. How many solutions have you found? Compare your solutions with other groups.

   GRID FOR YOUR SOLUTIONS,
   don´t forget to assign each rectangle a serial number:

   Answer the question. Make a true statement. Discuss it with your classmates.
   How large area is occupied in each of your solutions?
   Each archeological research area occupies ………………….…….. m^2.
   I found ……………………………….……….solutions.

4. **How many meters of cord (twine or tape) will you need for fencing of separate areas?**
   Lengths detection is the determination of different rectangles´ perimeter.
   The side of the square is 1 m long (unit of length). Define perimeters of all the figures/shapes drawn in your grid.

Serial number of the rectangle	Number of length units	Lenght of fencing in „m" (perimeter)

5. **Can you answer the following questions?**
   a) What are the dimensions of the rectangle with maximum perimeter?

   b) How many common sides must squares have to create the rectangle with maximum perimeter?

   c) Calculate the perimeter of rectangles when the square´s side length is 5 m.

Serial number of the rectangle	Number of length units (length unit = 5 m)	Lenght of fencing in „m" (perimeter)

   d) Calculate how many **m²** are there in **the area** of newly formed rectangles when the square´s side is 5 m, 6 m, 10 m long?

Serial number of the rectangle	Rectangle´s area 1 side = 5 m	Rectangle´s area 1 side = 6 m	Rectangle´s area 1 side = 10 m

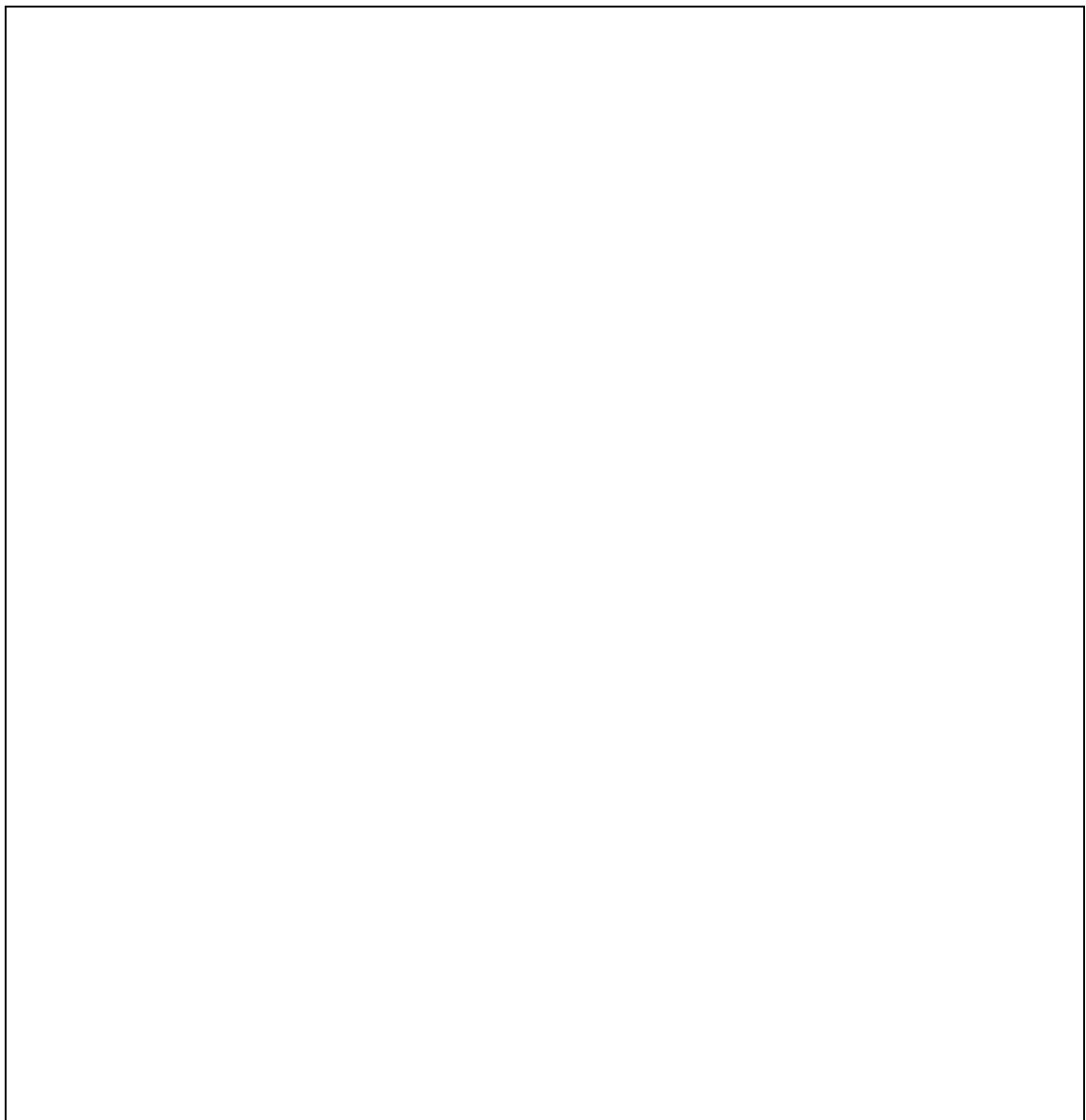6. **Do you agree with these conclusions of our experiment?**

a) The same number of squares in rectangles means that all the rectangles are of the same area.   **YES - NO**
b) The perimeters can be different for different rectangles.   **YES - NO**

7. **Something for experts** ☺
   What is the maximum perimeter when there are 18 squares?
   You can work in the group again, then help yourself with the grid.

   Could you find the rule, which helps you to define the maximum perimeter when there is an arbitrary number of squares?

8. **Finally enjoy two logical tasks...**
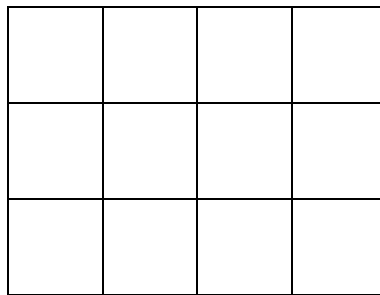   a) **FOUR SQUARES**

   You need: (wooden) skewers or matches

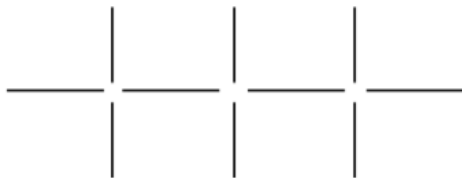   Task: Use 12 skewers to create 4 squares according to the given pattern:
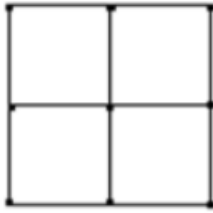
   Task: Rearrange (move) 3 skewers to create 3 squares. Plot (draw) your solutions on the grid.
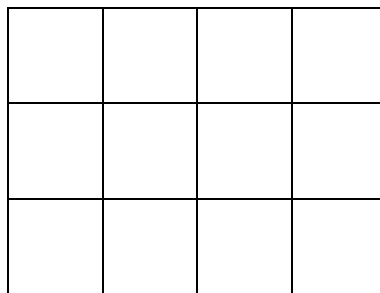
   b) **TWO SQUARES**

   You need: (wooden) skewers or matches

   Task: Use 10 skewers to create a structure according to the given model:

   Task: Rearrange 4 skewers to create <u>exactly</u> 2 squares.

   CONGRATULATIONS! YOU HAVE PARTICIPATED IN AN INTERESTING
   EXPLORATION ACTIVITY!
   Share your results with your friends ☺