Grades 5-8 (A), 9-12 (A)

Duration: 10-20 min

Tools: one 9 pcs Set / 1-2 student

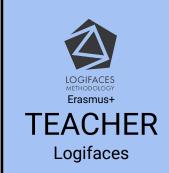
Individual / Pair work

Keywords: Regular prism

# 605 - Stacking Toblerone 9pcs



## **MATHS / COMBINATORICS**



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#### **DESCRIPTION**

Students stack all the blocks in the 9 pcs Set into a regular prism then consider the number of different stackings (two packings are different if the order of the elements is different).

## **SOLUTIONS / EXAMPLES**

$$5! \times 2^2 = 480.$$

DETAILS Each stacking has 4 fixed pairs: 112-122, 113-331, 123-123, 132-132 (see exercise  $\underline{602}$  - Pairing  $\underline{9pcs}$ ). The 4 pairs and the piece 222 have 5! permutations. In the pairs consisting of two different elements the order can be switched, that gives the factor 2  $^2$ .

#### ASSISTANCE FOR STUDENTS

First arrange the blocks into pairs! (This is exercise 602 - Pairing 9pcs.)

Calculate the number of the different orders of the 4 pairs and the block 222! (There are 5! permutations.)

In some pairs, the order of the blocks of the pair can be switched. Which pairs are these? (112-122 and 113-331)

### PRIOR KNOWLEDGE

Basic exercises in combinatorics

## **RECOMMENDATIONS / COMMENTS**

This is a difficult Combinatorics problem.

Exercise 602 - Pairing 9pcs is recommended before this exercise.