

Grade: 1-12

Duration: 20-45 min

Tools: one 16 pcs Set / 1-2 student

Individual/Pair work

Keywords: Regular prism

Title
up to 4 icons
Maths / COMBINATORICS



LOGIFACES
METHODOLOGY

TEACHER

Erasmus+
Logifaces

2019-1-HU01-KA201-0612722019-1

Description:

Students arrange the blocks of the 16 pcs Set into pairs to form regular prisms. By measuring and comparing edges and sides, students connect two Logifaces blocks and compose regular prisms.

Students consider the number of possible pairings of the blocks. (Two pairings are different, if there is at least one pair present in one pairing and not present in the other.)

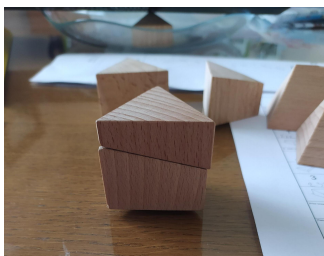
Level 1: Students first find two pairs that form regular prisms 555, then a pair that form regular prism 333. Arranging the remaining blocks into pairs gives the solutions of Case 1.

Level 2: Students find a pairing with only one pair that forms a regular prism 555 and without a pair that forms the regular 333. This gives the solutions of Case 2.

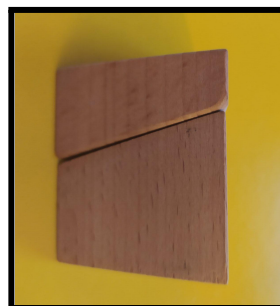
Level 3: Students find the blocks that can only be paired with one other block then find the possible pairings of the remaining blocks.

Level 4: Students find all the possible pairings without the assistance given in the Level 1-3 exercises.

Solutions/Guidelines:

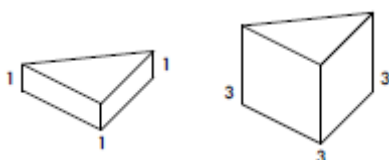


Blocks 321 and 321 form the regular prism 444

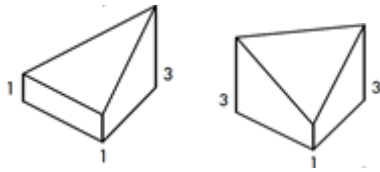


Blocks 233 and 112 form the regular prism 444

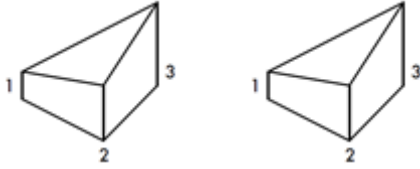
There are 8 blocks that can be paired with only one block. These blocks form the following prisms:
blocks 111 and 333 → prism 444



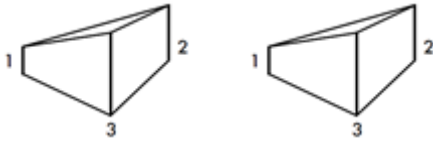
blocks 113 and 133 → prism 444



blocks 123 and 123 \rightarrow prism 444



blocks 321 and 321 \rightarrow prism 444

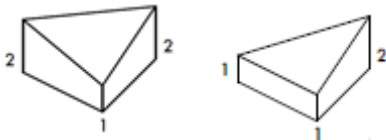


Observe, that the addition of the numbers $112+221=333$ works, but in the case of 123 and 321 it does not work: the blocks 123 and 321 do not form a regular prism, but the blocks 123 and 123 do. The reason is that in the formation of the prism the first number is added to the last one.

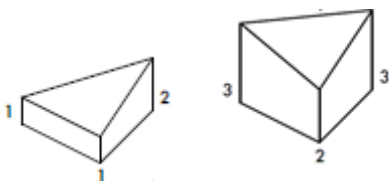
The remaining 8 blocks can be paired in two ways. The students can be helped to find both of the possible pairings by asking them to find pairings with 1 or 2 regular prisms 555.

Case 1:

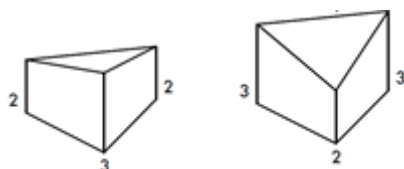
122 and 112 \rightarrow prism 333



112 and 233 \rightarrow prism 444

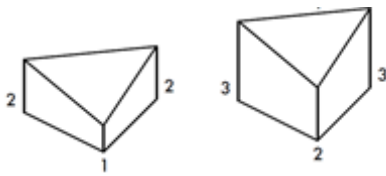


223 and 233 \rightarrow prism 555 there are 2 pairs of this type

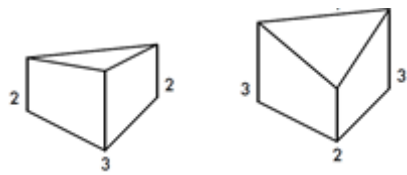


Case 2:

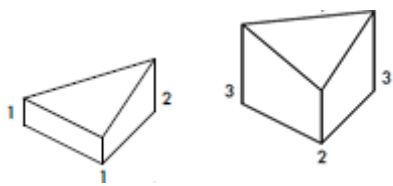
122 and 223 \rightarrow prism 444



223 and 233 → prism 555



112 and 233 → prism 444 (there are 2 pairs of this type)



Prior knowledge:
Regular prism

Recommendations/Comments:

For students in grade 1-4 this would be an advanced lesson.

For students in grade 5-12 this can be a warm-up exercise before the more difficult combinatorics problems.

The exercise can be used to differentiate within a class.