

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

Duration: 10 min

Tools: one Logifaces Set / 1-2 students

Individual / Pair work

Keywords: Symmetry, Planes of symmetry

524 - Symmetry of Given Blocks



MATHS / TRANSFORMATIONS



LOGIFACES
METHODOLOGY
Erasmus+

TEACHER

Logifaces

2019-1-HU01-KA201-0612722019-1

DESCRIPTION

Students build structures with plane symmetry (and with continuous surface) using the following blocks from the 16 pcs Set:

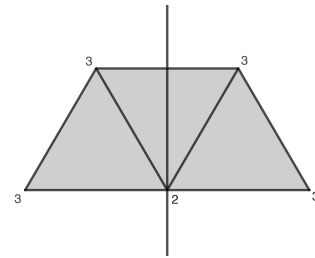
- three blocks 233
- two blocks 223 and two blocks 233
- two blocks 223 and three blocks 233
- two blocks 123 and two blocks 132

SOLUTIONS / EXAMPLES

Since the top faces are not all in the same plane, while the base faces are, only vertical planes of symmetry are possible.

Three blocks 233:

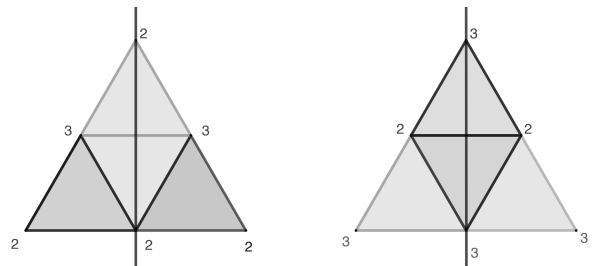
Three blocks can only be placed next to each other to form a row, so only one type of floor plan is possible. Then the plane of symmetry passes through the middle block, so only one arrangement is possible:



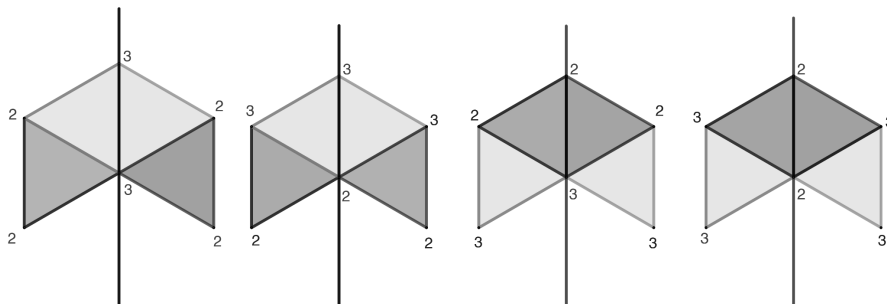
Two blocks 223 and two blocks 233:

The fourth block can be placed next to three assembled blocks in two ways so that the floor plan remains axially symmetric: we get either a triangle or a "croissant".

- In a triangular arrangement, either block can be in the middle that has plane symmetry. In the figure, the congruent blocks are

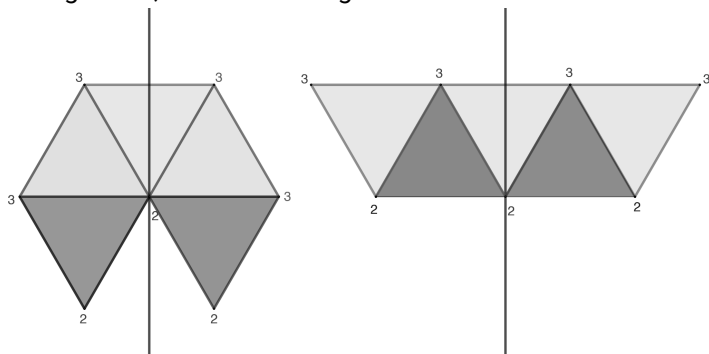


- In the "croissant" arrangement, two blocks must be the same type when they are symmetrical with respect to the plane of symmetry (this rule does not hold for the blocks 123 and 132, since they are the reflections of each other). This gives four possible layouts:



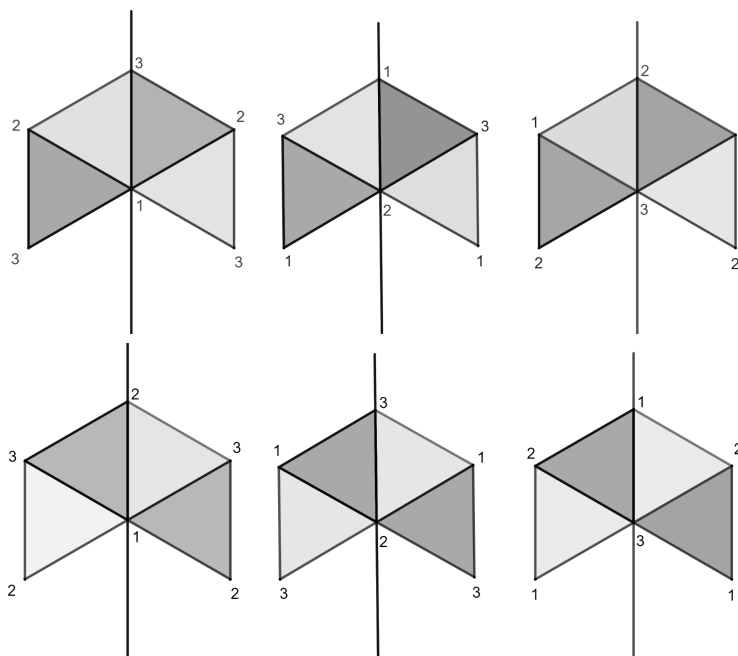
Two blocks 223 and three blocks 233:

Five blocks can be placed in either a row or a “croissant” shape. In both cases there is only one possible arrangement, shown in the figure.



Two blocks 123 and two blocks 132:

Since no two congruent blocks can be joined together, only a “croissant” arrangement is possible in this case, the two blocks alternately follow each other (the blocks 123 and 132 are the reflections of each other). The first block can be chosen in two ways and then placed in three different ways, so we get six possible cases:



PRIOR KNOWLEDGE

Plane symmetry

RECOMMENDATIONS / COMMENTS

We recommend this exercise after [522 - Planes of Symmetry](#) and [523 - Symmetry of two Blocks](#), which are easier exercises.

The exercises with different numbers of blocks can be given to different students or pairs.