

Good practices INTER_523A_EN

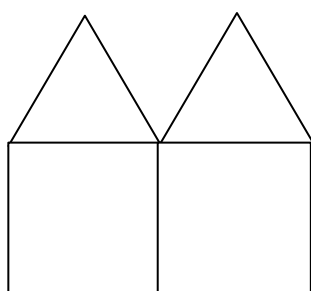
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Description of the problem / exercise: **Twin house building**

Sets used: Triangle, square

The people of Biscuit town are building twin houses. The twin houses are always built of two square and two triangle elements. The plan of the twin house can be seen here:



When building a twin house, architects should consider the following conditions:

- Only shapes with the same colour and same size can be connected.
- A twin house will be occupied by two different families, so the base colour of the two sides of the house (square element) does not have to be the same.
- The large squares of the square elements on either side of the house match each other in colour and size.
- The roofs of the houses are made of a triangle element, so that the middle triangle is at the top of the roof. The two tops should be the same colour, but only yellow or green.
- The large triangle shape of the roof triangle element always matches the large square of the side in colour.
- The small triangle colour-matches the small square on either side of the house.
- The medium sized squares are also colour-matched, their colour can only be yellow or green.

Become the architect of Biscuit town. Build the twin houses!

Tasks and questions related to the text:

1. Build a twin house according to all the criteria mentioned above.
2. Using a set of triangles and a set of squares, construct all the possible twin houses. Of course, all given requirements must be taken into account when building.
3. How many families can we accommodate in the new residential area of Biscuit town, which will be built according to the above criteria? Each twin house can accommodate two families.

4. Once all the twin houses are built, you can observe that you have several house forms (1 square 1 triangle) within the twin houses. In total, how many house shapes appear?
5. Is it possible to build a new residential area in Biscuit town by building all the twin houses next to each other on the same street, next to each other (terraced houses)? The terraced houses will also have the same size and colour matching. Is it possible to build a terraced house by alternating the colours of the roof tops (green and yellow) in pairs?
6. Additional twin houses can be built by omitting some of the conditions or by specifying additional conditions on colour and matching. You can also specify conditions that cannot be fulfilled.

Solutions:

1. A twin house built on the given conditions.



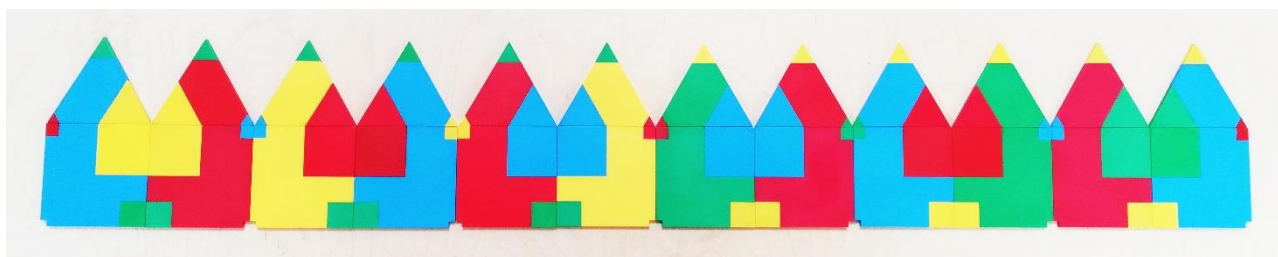
2. Only the medium yellow (6 pieces) or green (6 pieces) triangle can be the top shape of the roof of a twin house. Therefore a total of 6 twin houses can be built.



3. In the new residential area of Biscuit town, we can provide homes for a total of 12 families living in the 6 twin houses shown above.

4. Six house shapes (1 square 1 triangle) can be observed within the twin houses. A total of 36 house shapes are shown.

5. All the twin houses can be built side by side in a line as terraced houses. But we cannot alternate the colour of the roof tops in pairs.



- *Why this exercise is good: It introduces shapes and sizes to pupils in a playful way (construction). Based on the given criteria, the pupil has to group the elements, organise them and choose the one that meets the requirements. The pupils have to look for several possible solutions.*
- *Which level is recommended: Lower-grades of elementary school (6-10 years)*
- *School subject(s): Mathematics, environment, technology*