

2. **PATTERN RECOGNITION** (looking for similarity and trend within a problem)

The pattern is:

- to build a cube you need six squares
- on the plan development of a cube the squares must have at least one side close to another square;
- you need to move at least one square to have a new plan development;
- squares of the same color cannot be placed next to each other because opposite faces of the cube must have the same color;
- the positions of the six squares are allowed because the cube needs to close and no face must be over another;
- you need to control trying to build the cube starting from the plan development proposed

3. **ABSTRACTION** (focusing on the important part of a problem, filtering out unnecessary details)

Starting from one of the most known plan developments of the cube, for example the cross shape one, the students will:

- design the plan development of the cube on a checkered sheet
- color the squares with different colors;
- move one of the six squares to different find solution;
- show off the possible development solutions;
- check the possible solution by creating the cube with the square sheets obtained by folding;
 - make a cube finding out the pattern by working with their spatial vision.

4. **ALGORITHM DESIGN** (create a step by step sequence of instruction to solve the problem)

TO BUILD THE CUBE WITH ORIGAMI

step 1 Take twelve rectangular colored sheets (3 equal colors).

step 2 Fold the sheet by matching the short sides (repeat for all colored sheets), marking the fold well.

Step 3 Take two sheets of the same color and place them at 90° relative to each other.

step 4 The first sheet should be stretched, the second place the shorter fold aligned to the folding of the first sheet.

step 5 Close the sheets following the fold pattern previously created.

step 6 The last part of the leaflet should be inserted in the pocket that has been created. This way you get the first square tile

step 7 Repeat the operation with all the other sheets (remember that each square tile is obtained using 2 sheets of the same color). At the end we get 6 tiles (of three colors).

Step 8 Take 12 smaller rectangular sheets (they will close the cube).

Step 9 Take a colored tile (it will be the base of the cube) and place the smaller pieces of paper in the pockets of the card for half.

Step 10 Take the other colored tiles by inserting the other half of the small paper into the pockets. The opposite face must be of the same color.

TO FIND OUT THE ELEVEN PLAN DEVELOPMENTS

Step 11 Move the 6 colored tiles trying to create a cube with symmetrical monochrome faces.

Step 12 Find all possible combinations to get cubes where the tiles will have a different arrangement on the floor.

Step 13 Use the checkered sheet and the colored pencils, to draw the different arrangements of the tiles in the plane obtained.

Assessment :

The assessment of learning can take place through the production of the students and their way of working using soft skills:

- using their own geometric knowledge;
- participation at the activities;
- sharing ideas and opinions on the work given with their mates (*Cooperative learning and Peer-Tutoring*).

Expected results: students' abilities to solve the problem and find all the 11 solutions

Notes: