

# TILE WITH STYLE

## FESTIVAL GUIDE

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Mathematics  
Festival**

## Materials and Setup

Per table (assuming 5 students per table), you will need:

Per Table	Material Preparation	
Pattern blocks*	Place the pattern blocks in five containers.	
5 sheets of 4" x 4" origami paper	You could also cut a regular sheet of paper into four squares.	
<p>*If you use the pattern blocks from the link below, print Task pages 5-6 and table sign p. 7.</p> <p>If you use standard colored pattern blocks (yellow hexagon, red trapezoid, orange square, green triangle, blue rhombus, tan thin rhombus), print Task pages 8-9 and table sign p. 10.</p>		
5 copies of Tasks with Instructions	2-page sheet <i>can be printed double-sided</i>	p. 5-6 OR p. 8-9
1 copy of Table Sign	1-page sheet <i>print on cardstock for sturdiness</i>	p. 7 OR p. 10

Per Table	Purchasing Materials		
Pattern blocks	<a href="#">209 pattern blocks</a> (order two sets) \$11.99 each		
Origami paper	<a href="#">pack of 100</a> for \$7.99		
5 plastic sheet protectors	<a href="#">pack of 100</a> for \$7.67	<a href="#">pack of 500</a> for \$26.99	These are recommended in order to protect the documents that students will be handling.





## Objective

Cover an origami paper with pattern blocks using a variety of different shape combinations.

Rules:

1. The entire paper must be covered, leaving no gaps.
2. It is okay if parts of tiles lie outside the paper – i.e, the tiling can be bigger than the paper.

## Materials

Each Tile with Style table should be prepped for 5 stations.

Each station needs:

1. Container of assorted pattern blocks.
2. Tile with Style tasks with instructions.
3. Origami paper (or any paper square).

## How to Play

**We strongly encourage you to explore the activity yourself ahead of time.**

You can try our digital version here: [jrmf.org/puzzle/tile-with-style](http://jrmf.org/puzzle/tile-with-style)

Introduce the activity without overexplaining it and without telling what strategies students might want to use. As much as possible, avoid giving away answers. Students should be encouraged to explore, experiment, and learn from their mistakes.

1. Have the student replicate Puzzle 1 on their paper using a hexagon shape and a trapezoid shape.
2. Together, explore the ideas of rotating and flipping the two shapes so that they can completely cover the whole paper with just those two shapes.
3. Have them explore the rest of the puzzles.

## Standards

1. Make sense of problems and persevere in solving them. CCSS.MP1
2. Attend to precision. CCSS.MP6
3. Compose two-dimensional shapes to create a composite shape. CCSS.1.G.A.2



## Asking Good Questions

1. Ask questions about confidence.
  - a. When a student asks you “Is this right?”, instead of saying “yes” or “no” right away, ask them how confident they are in their answer. Here are some examples:
    - i. “Maybe. What do you think? How confident are you?”
    - ii. “On a scale of 1-5, how confident are you in your answer?”
  - b. If a student is not confident in their answer, follow up by asking “What would help you feel more confident in your answer?” or “Why do you not feel confident?” This helps you determine how best to help the student through their explorations.
2. Ask students about choices.
  - a. When a student is stuck or shows you a wrong answer, instead of jumping in and showing the student the correct answer, start by asking about the choices that the student made along the way. Here are some suggested steps to follow:
    - i. Start from the beginning.
    - ii. Ask students to show you what they’ve tried so far.
    - iii. When the student gets to a point where they have different choices, ask the student “What other choices can you make here?”
    - iv. Have the student make a different choice and try to solve the puzzle. This helps the student see that they have the power to make different choices during an activity, and they’ll start to do this on their own in the future.
    - v. If you’re familiar with the puzzle or a particular solution, stop the student only when a different choice will help them get to the solution. This will help them feel successful faster without you giving away too much of the answer.
3. Ask students about strategies.
  - a. If a student is getting into the activity and has been doing it for a while, ask the student if there are any strategies they’ve come up with to help them solve the puzzle or win the game.
  - b. Follow up by asking if they think their strategies will work for all puzzles and/or larger puzzles, more complex puzzles, etc. Have the student explore more complex puzzles to test out their strategies.
  - c. This is a great way to encourage a student to dive deeper into an activity and to start looking for patterns, structure, and proofs.

## Answers

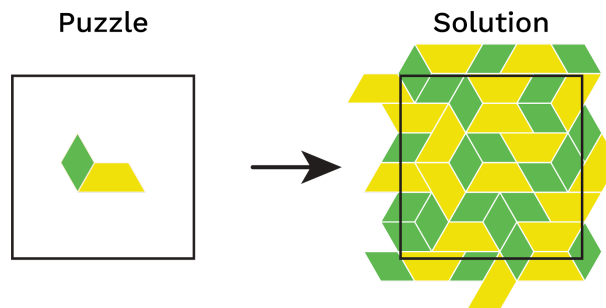
Answers will vary. This is a great opportunity to encourage students to be creative, try out different designs, and explore whatever patterns interest them most.

Puzzles 5, 9, and 14 are impossible. All other puzzles are possible.

## Tile with Style Tasks

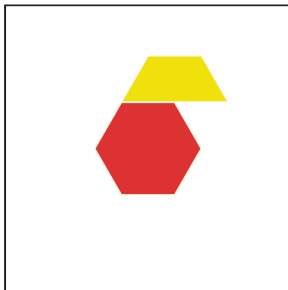
### Rules:

- Start by making the puzzle's design in the center of your paper.
- Try to cover the rest of the paper using **only** the shapes in that design.
- It's okay if some of the tiles go over the edge of the paper.

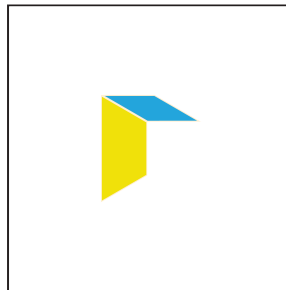


At least one of these 6 puzzles are impossible. Which puzzles are impossible, and why are they impossible?

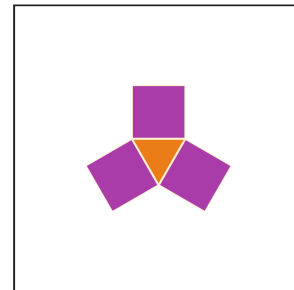
Puzzle 1



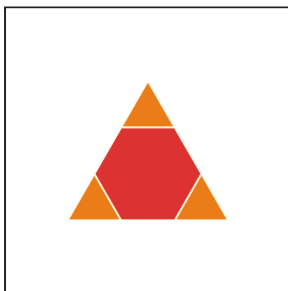
Puzzle 2



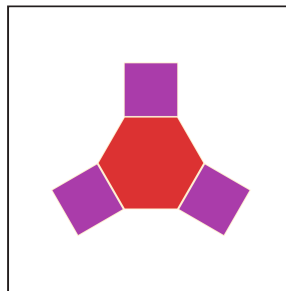
Puzzle 3



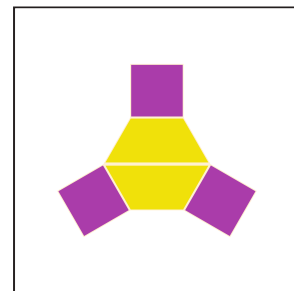
Puzzle 4



Puzzle 5



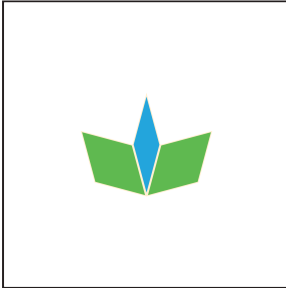
Puzzle 6



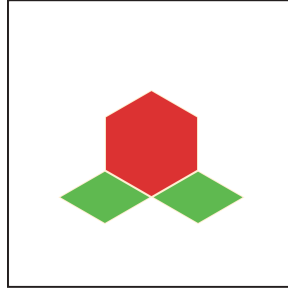
## Tile with Style Tasks

At least two of these 9 puzzles are impossible. Which puzzles are impossible and why are they impossible?

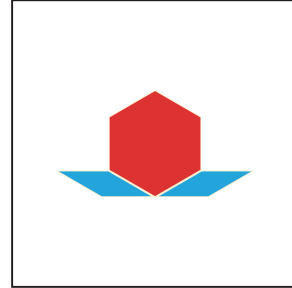
Puzzle 7



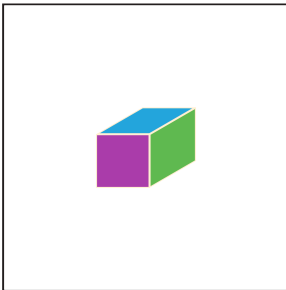
Puzzle 8



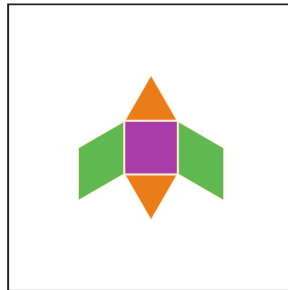
Puzzle 9



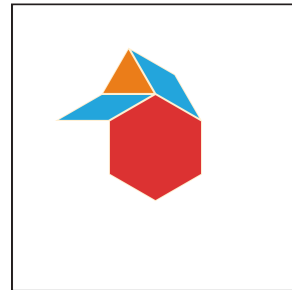
Puzzle 10



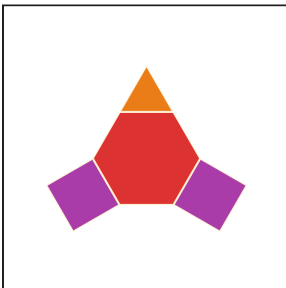
Puzzle 11



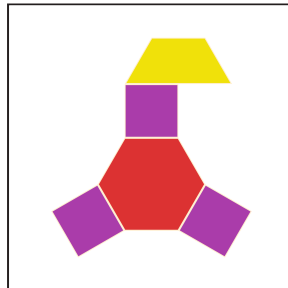
Puzzle 12



Puzzle 13



Puzzle 14



Puzzle 15





Play for free at  
[jrmf.org/puzzle/tile-with-style](http://jrmf.org/puzzle/tile-with-style)



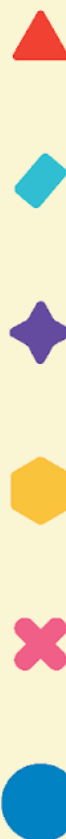
# TILE WITH STYLE



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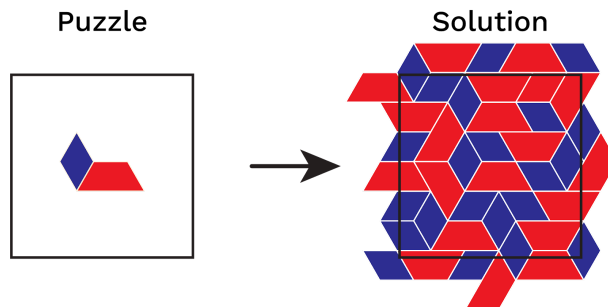
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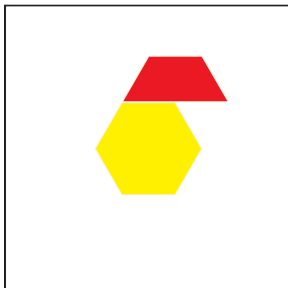
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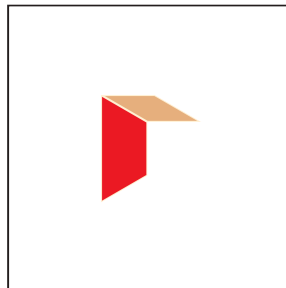


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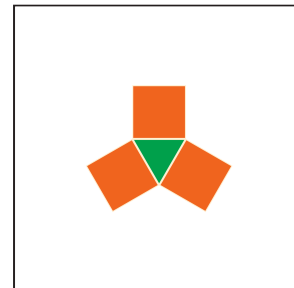
Puzzle 1



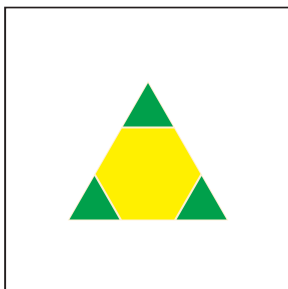
Puzzle 2



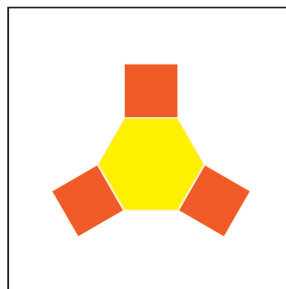
Puzzle 3



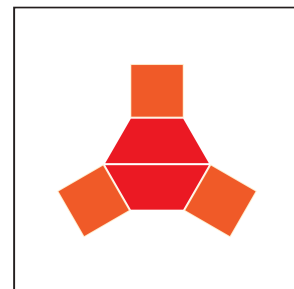
Puzzle 4



Puzzle 5



Puzzle 6

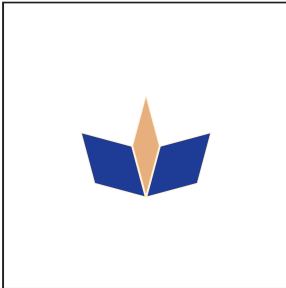




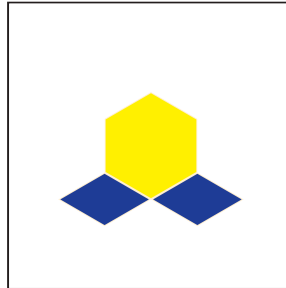
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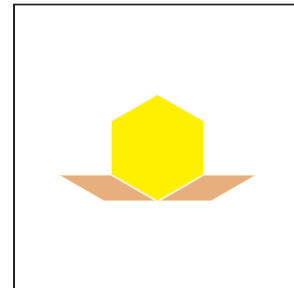
Puzzle 7



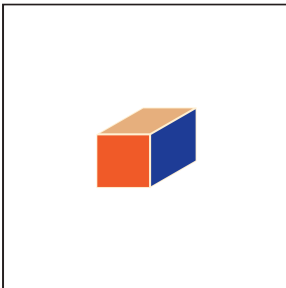
Puzzle 8



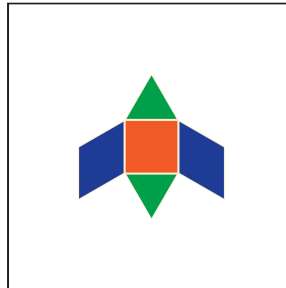
Puzzle 9



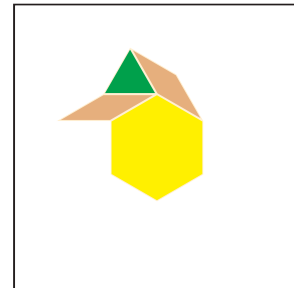
Puzzle 10



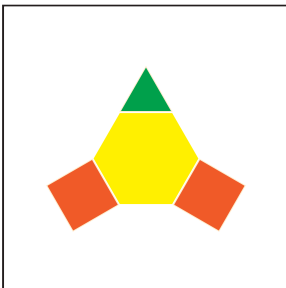
Puzzle 11



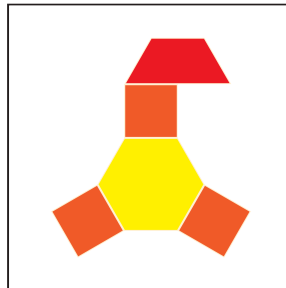
Puzzle 12



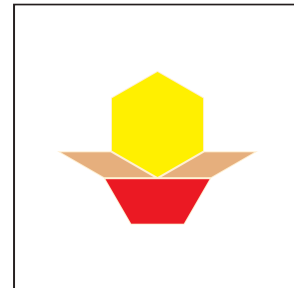
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