PENTOMINOES

ACTIVITY GUIDE
BEGINNER VERSION

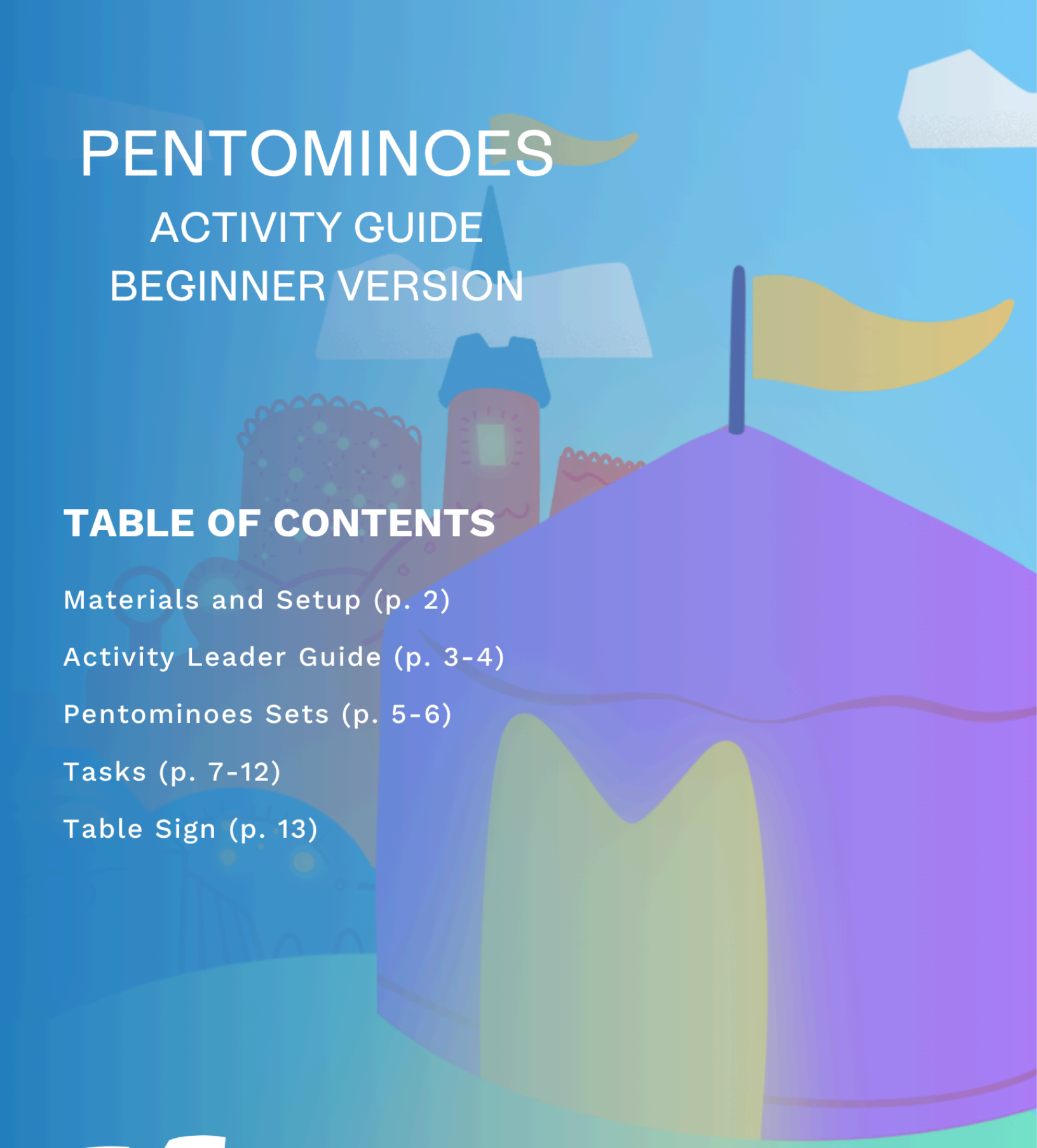


TABLE OF CONTENTS

Julia Robinson Mathematics Festival

Materials and Setup

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

Per Table	Material Preparation	
5 Pentomino sets	Each set has 12 unique pieces.	
5 copies of Pentominoes Sets sheets	2 pages each *print single-sided* *(students need to be able to use both pages simultaneously.)*	p. 5-6
5 copies of Tasks	6 pages each *can be printed double-sided in black and white*	p. 7-12
1 copy of Table Sign	1 page *print on cardstock for sturdiness*	p. 13

Per Table	Purchasing Materials		
5 pentomino sets	6 pentomino sets for $24.13		
20 plastic sheet protectors	pack of 100 for $7.67	pack of 500 for $26.99	These are recommended in order to protect the documents that students will be handling.

What does "beginner version" mean?

This version of Pentominoes was created with PreK - 2nd grade students in mind. However, "beginner" does not mean "easy," and this version of Pentominoes can be an effective way to engage students of any age who:

- Have strong math anxieties
- Don't feel confident with math or math puzzles
- Have learning differences
- Want a gentler start to the activity

Older students and parents at our events often engage with this beginner version and move on to the regular version when they feel ready.

Objective

Cover the shapes with different pentomino combinations.

Rules:
1. You can only use each pentomino once per challenge.
2. Pentominoes must fit inside the shape without overlapping.

Materials

Each Pentominoes table should be prepped for 5 stations.
Each station needs:
1. Pentomino set (12 distinct shapes).
2. Pentominoes sets sheets.
3. Pentominoes tasks.

How to Play

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 ready all 12 pentomino pieces laid out on pages 5 and 6. *For very young students, have them place each pentomino on its corresponding shape on the two pages.*
2. Demonstrate the first task by asking the student to choose two pentominoes they think might cover the shape. Then ask if they can cover the same shape with two other pentominoes.
3. Have the student explore the rest of the tasks.

Standards

1. Make sense of problems and persevere in solving them. CCSS.MP1
2. Construct viable arguments and critique the reasoning of others. CCSS.MP3
3. Look for and make use of structure. CCSS.MP7
4. 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.

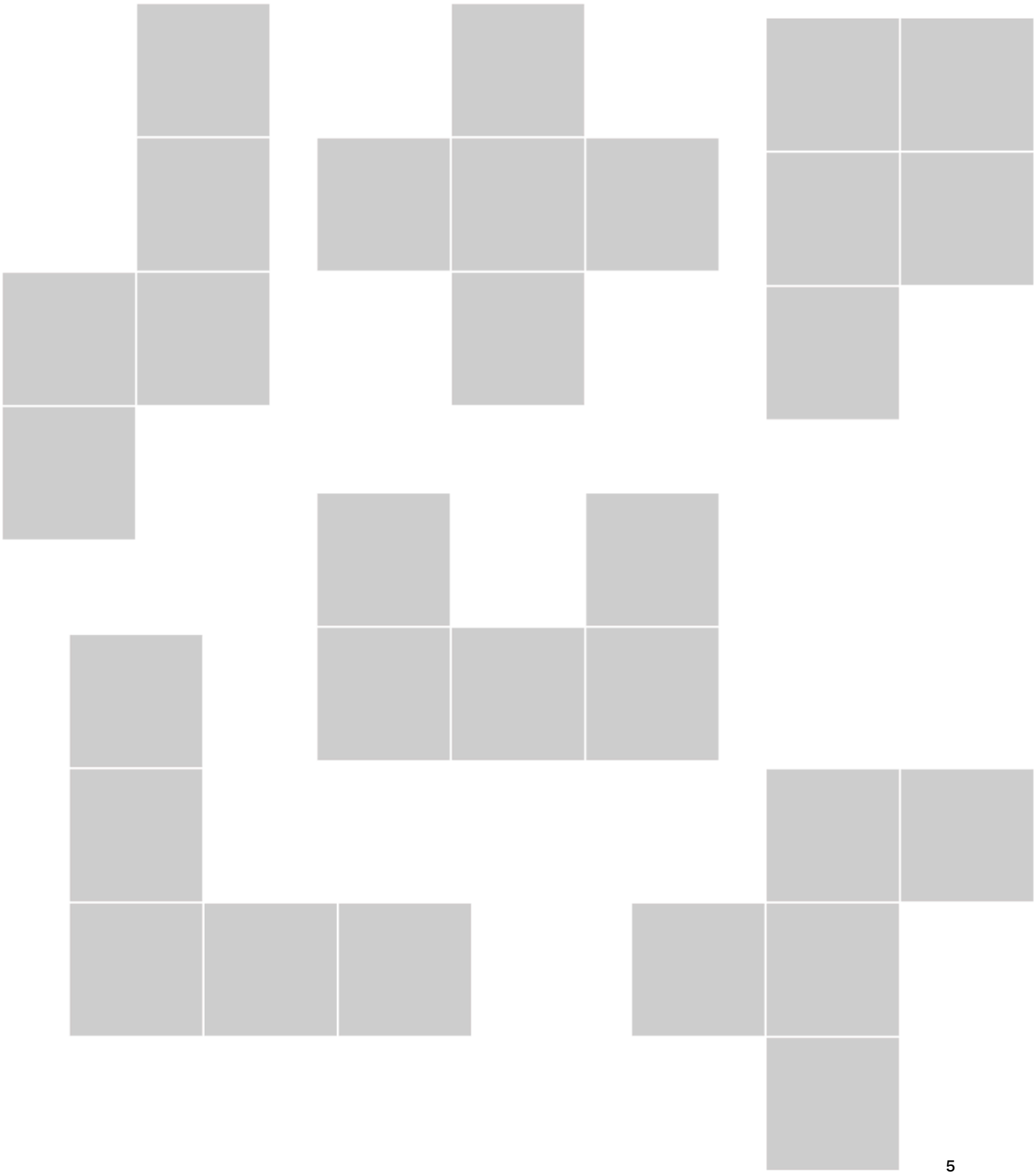
2. Ask students about choices.
    a. When a student is stuck or shows you a wrong answer, instead of jumping in and showing the student the correct answer, start by asking about the choices that the student made along the way. Here are some suggested steps to follow:
        i. Ask students to show you what they’ve tried so far.
        ii. When the student gets to a point where they have different choices, ask the student “What other choices can you make here?”
        iii. 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.
        iv. 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.

4. Activity specific questions.
    a. Are there any pentominoes you know won’t work? Why?
    b. Are there any pentominoes that are easy to work with? Why?

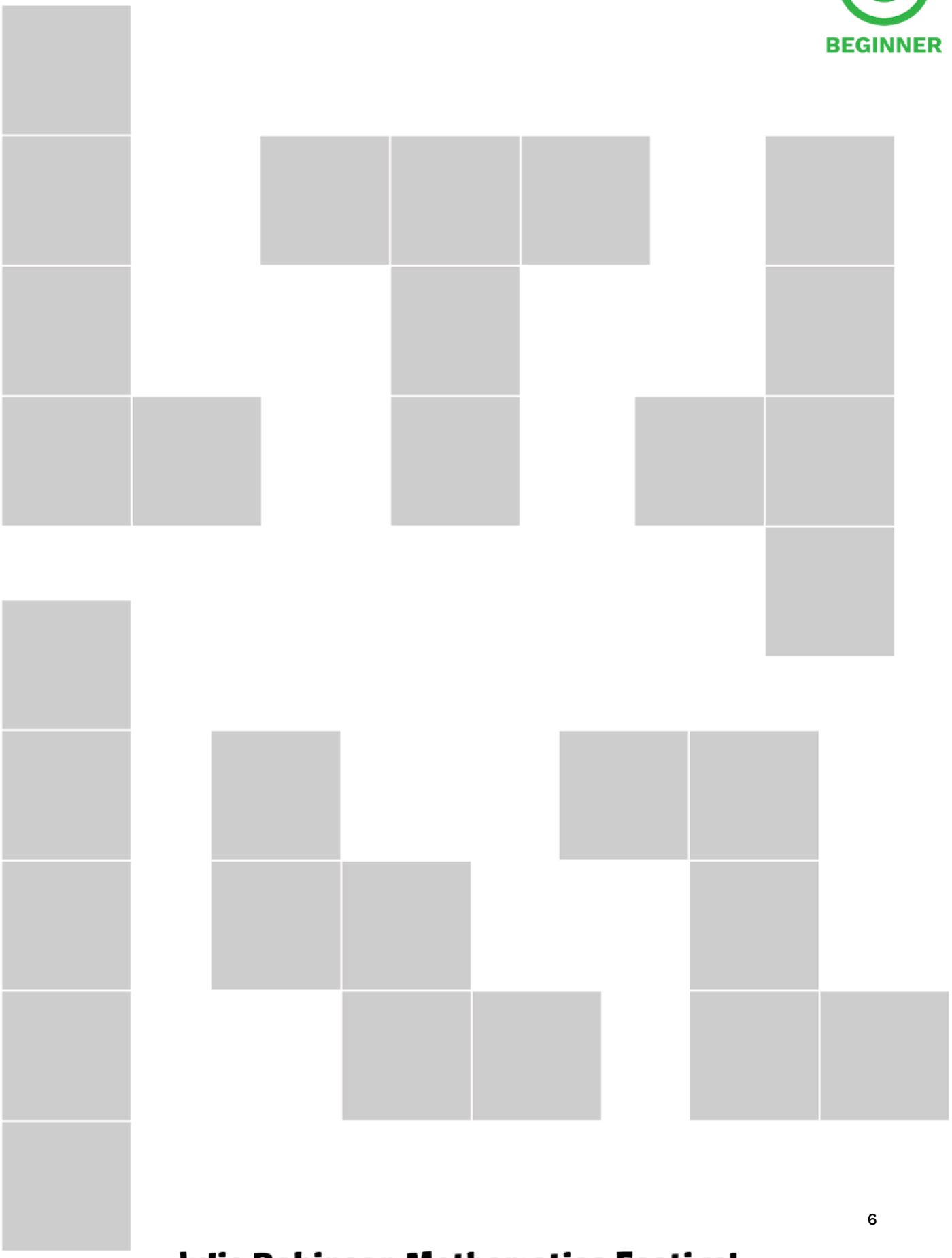
Pentominoes Set #1

BEGINNER



Pentominoes Set #2

BEGINNER

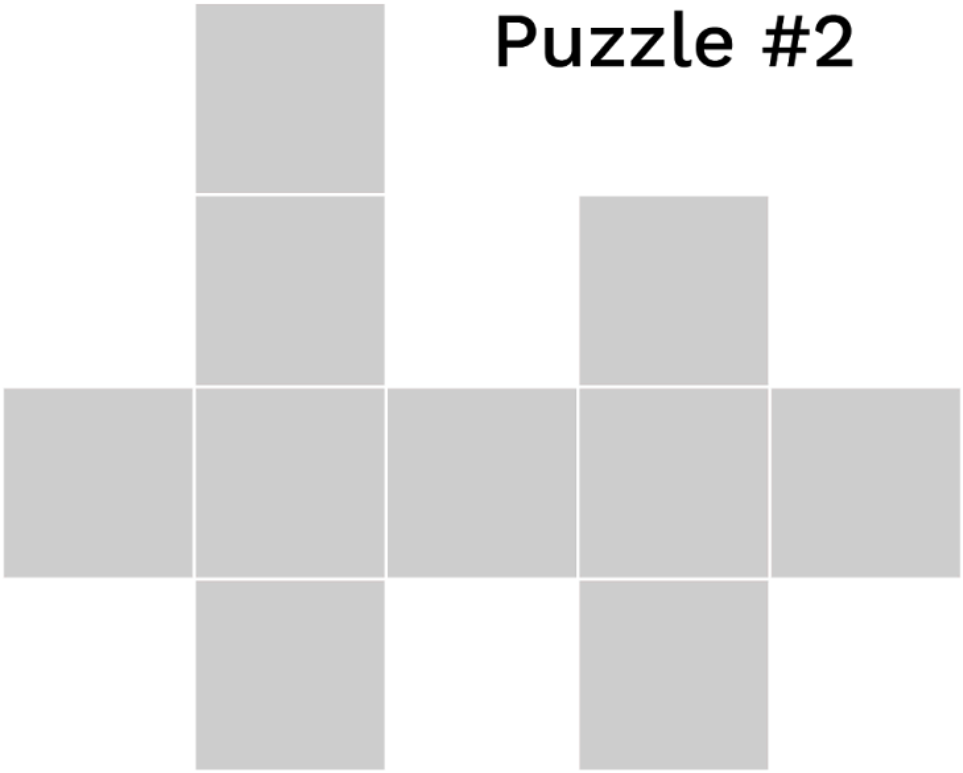


Pentominoes

BEGINNER

Puzzle #1

Puzzle #2



Pentominoes

BEGINNER

Puzzle #3

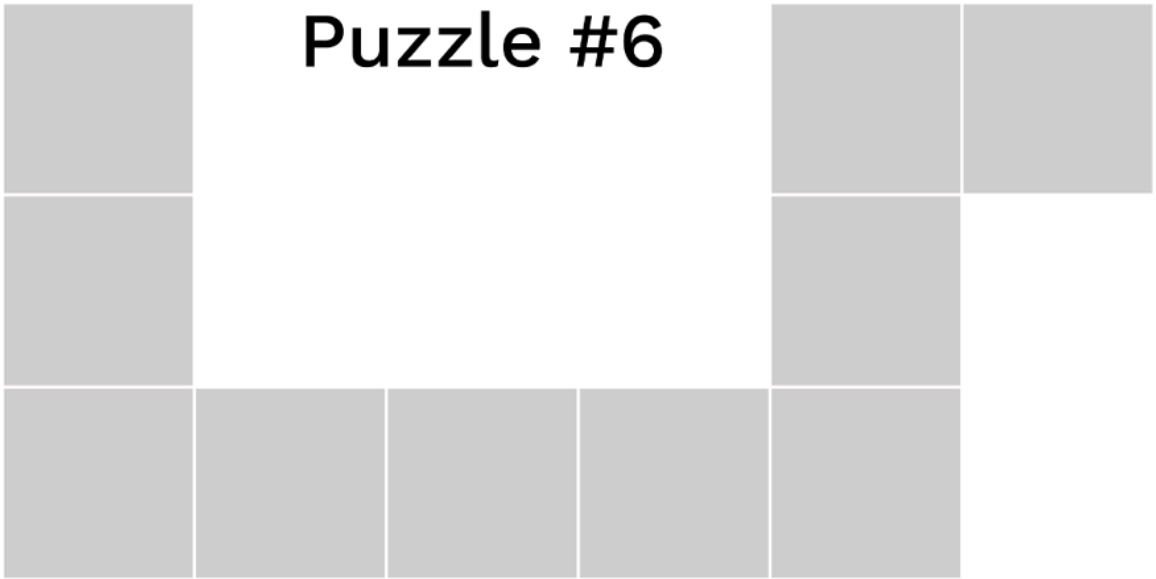
Puzzle #4

Pentominoes

BEGINNER

Puzzle #5

Puzzle #6



Pentominoes

BEGINNER

Puzzle #7

Puzzle #8

Pentominoes

BEGINNER

Puzzle #9

Pentominoes

BEGINNER

Puzzle #10

Play for free at
jrmf.org/puzzle/pentominoes

PENTOMINOES

BEGINNER

Julia Robinson
Mathematics
Festival

Julia Robinson
Mathematics
Festival

BEGINNER

PENTOMINOES

Play for free at
jrmf.org/puzzle/pentominoes