

PALINDROME SWAP FESTIVAL GUIDE

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**Julia Robinson
Mathematics
Festival**

Materials and Setup

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

Per Table	Material Preparation	
3 copies of Instructions	1-page sheet	p. 6
5 copies of Tasks	4-page sheet <i>can be printed double-sided</i>	p. 7-10
5 copies of Play Mats	4-page sheet <i>can be printed double-sided</i>	p. 11-14
5 copies of Card Mats	1-page sheet	p. 15
5 sets of Palindrome Swap Cards	Print Palindrome Swap cards and then cut out.	p. 16
1 copy of Table Sign	1-page sheet <i>print on cardstock for sturdiness</i>	p. 17

Per Table	Purchasing Materials		
28 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.



Objective

Swap cards so that every row and column follows a different palindrome* rule:

All the same color



All the same shape



Color palindrome



Shape palindrome



Rules:

1. Begin by using the cards to create the initial puzzle.
2. To solve, swap cards so that every row and column follows one of the four rules.
3. Each row and column must follow a different rule.

*A palindrome is a sequence of letters, numbers, shapes, colors, or other objects that are the same forwards and backwards.

Materials

Each Palindrome Swap table should be prepped for 5 stations.

Each station needs:

1. Palindrome Swap card set.
2. Palindrome Swap instructions.
3. Palindrome Swap tasks.
4. Palindrome Swap play mats.
5. Palindrome Swap card mat.

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. Use the cards to show students the possible palindromes.
2. Have the student create the first design by laying the cards on the play mat.
3. Have the student help you solve the first puzzle.
4. Have the student explore the next puzzles.

For younger students, you may want to first involve them in creating a variety of palindromes using the cards without the playmat.

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. Model with mathematics. CCSS.MP4
4. Look for and make use of structure. CCSS.MP7

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.



Palindrome Swap Instructions

Rules:

1. A *palindrome* is a sequence of letters, numbers, shapes, colors, or other objects that are the same forwards and backwards.

<p>Examples:</p> <p>racecar</p> <p>1221</p> <p>▲ ■ ★ ★ ■ ▲</p>	<p>Nonexamples:</p> <p>banana</p> <p>12345</p> <p>▲ ■ ▲ ■ ▲ ■</p>
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2. To start each puzzle, make the design that you see using your cards.
3. Swap cards so that every row and column follows one of these four rules:

1. All the same color



2. All the same shape



3. Color palindrome



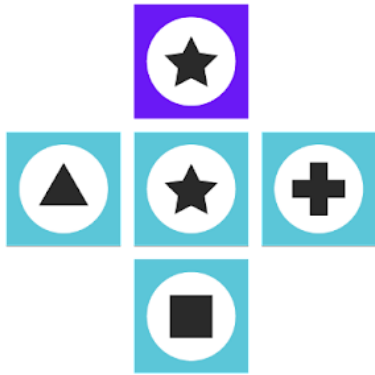
4. Shape palindrome



4. Each row and column must follow **different** rules.
5. Above each puzzle is an optional challenge: Try to solve the puzzle in the number of swaps listed above the puzzle.

Palindrome Swap Puzzles

Puzzle 1: 1 Swap



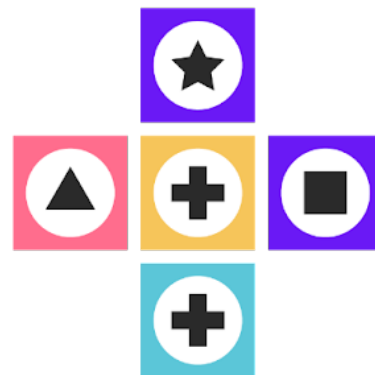
Puzzle 2: 1 Swap



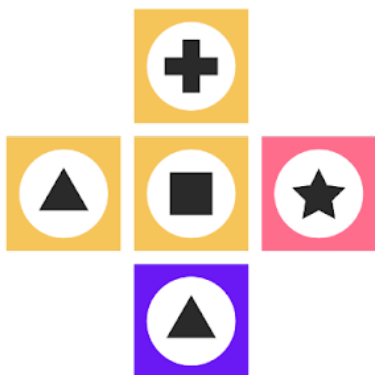
Puzzle 3: 1 Swap



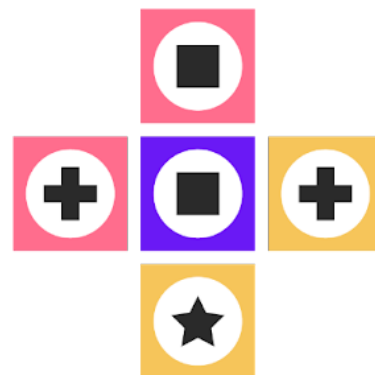
Puzzle 4: 2 Swaps



Puzzle 5: 2 Swaps

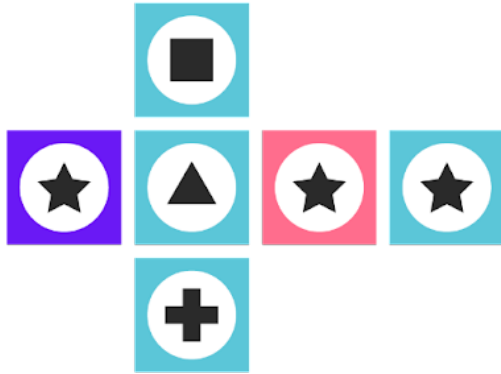


Puzzle 6: 2 Swaps

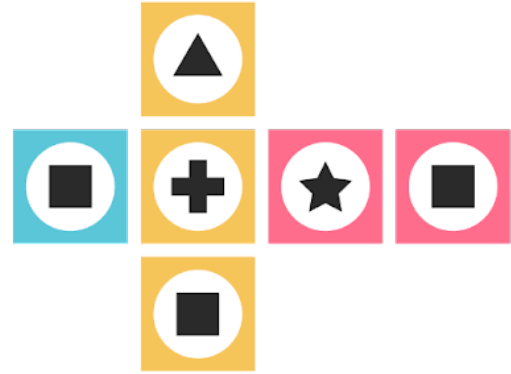


Palindrome Swap Puzzles

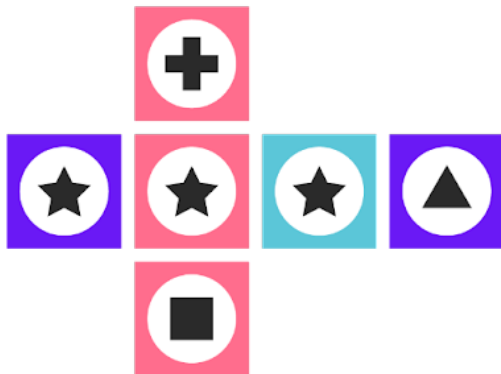
Puzzle 7: 2 Swaps



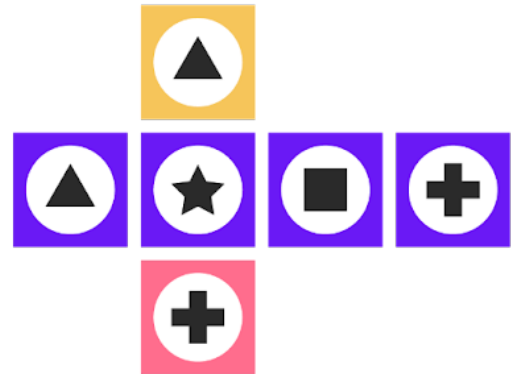
Puzzle 8: 2 Swaps



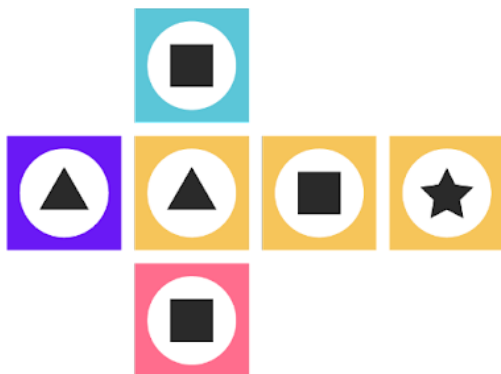
Puzzle 9: 2 Swaps



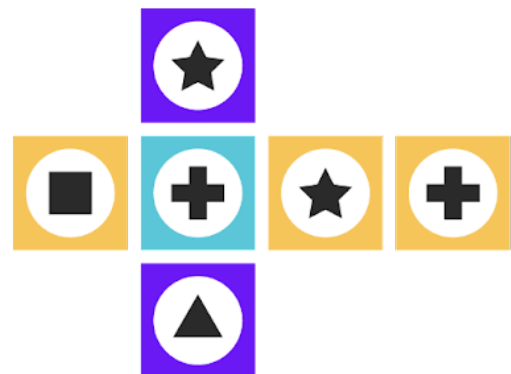
Puzzle 10: 3 Swaps



Puzzle 11: 3 Swaps

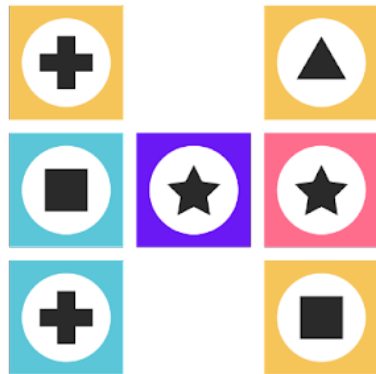


Puzzle 12: 3 Swaps

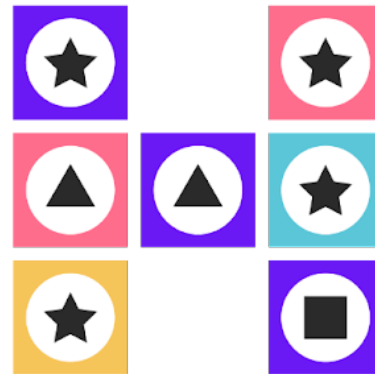


Palindrome Swap Puzzles

Puzzle 13: 3 Swaps



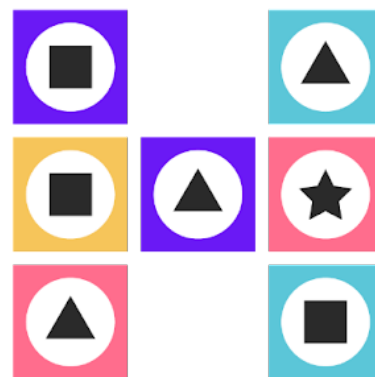
Puzzle 14: 3 Swaps



Puzzle 15: 3 Swaps

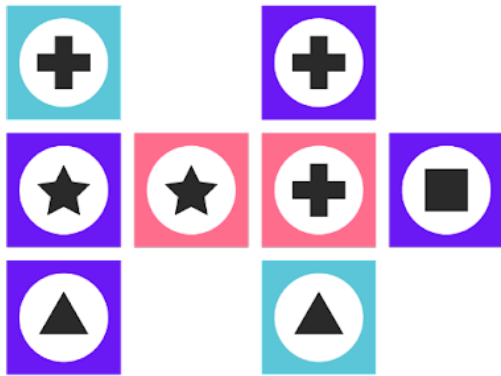


Puzzle 16: 3 Swaps

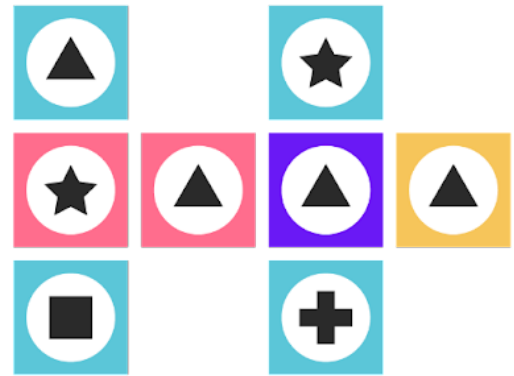


Palindrome Swap Puzzles

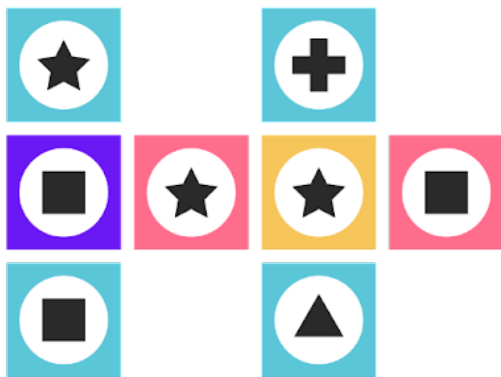
Puzzle 17: 3 Swaps



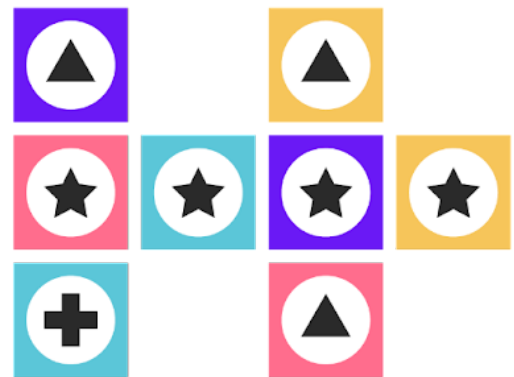
Puzzle 18: 3 Swaps



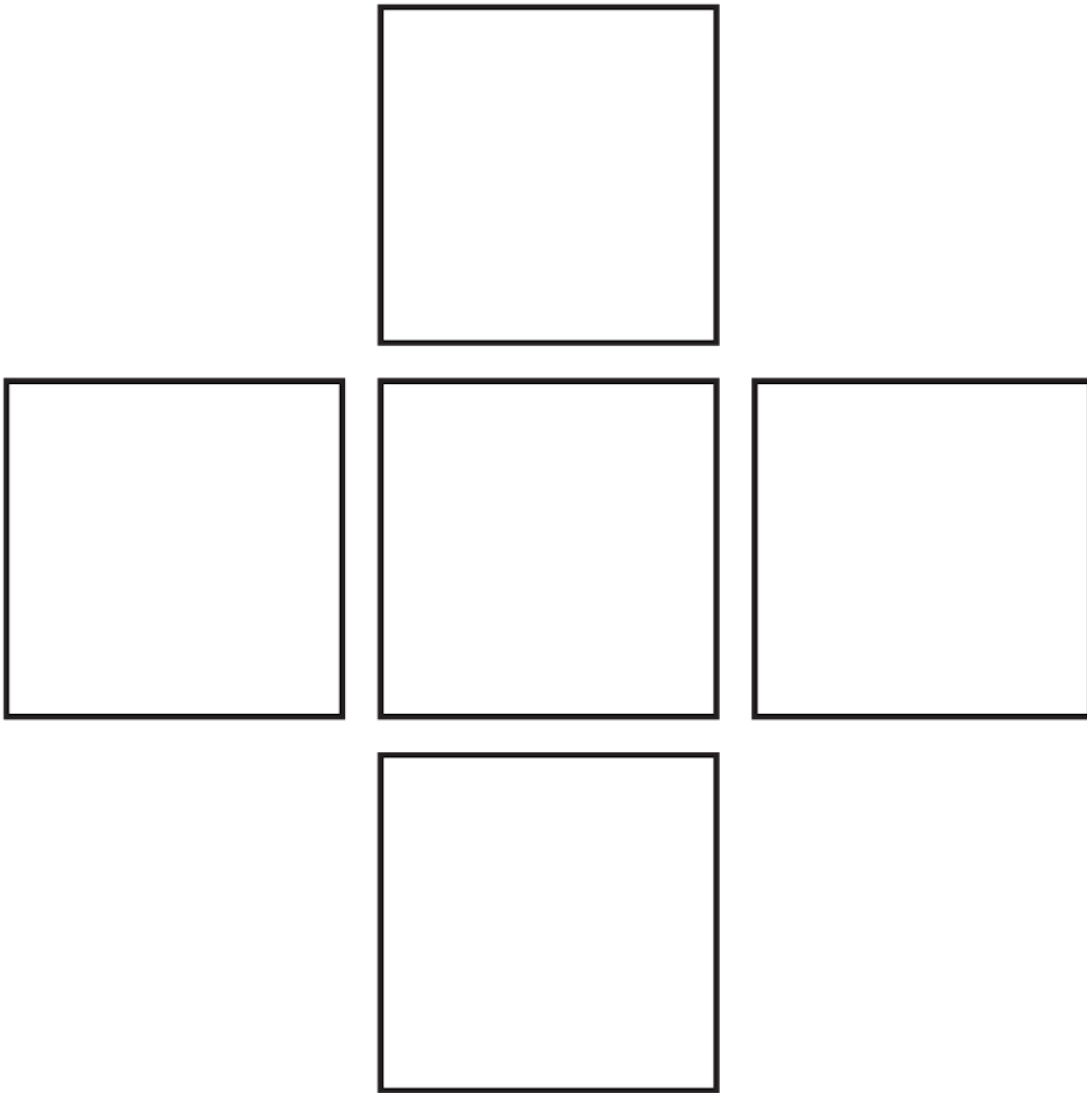
Puzzle 19: 4 Swaps



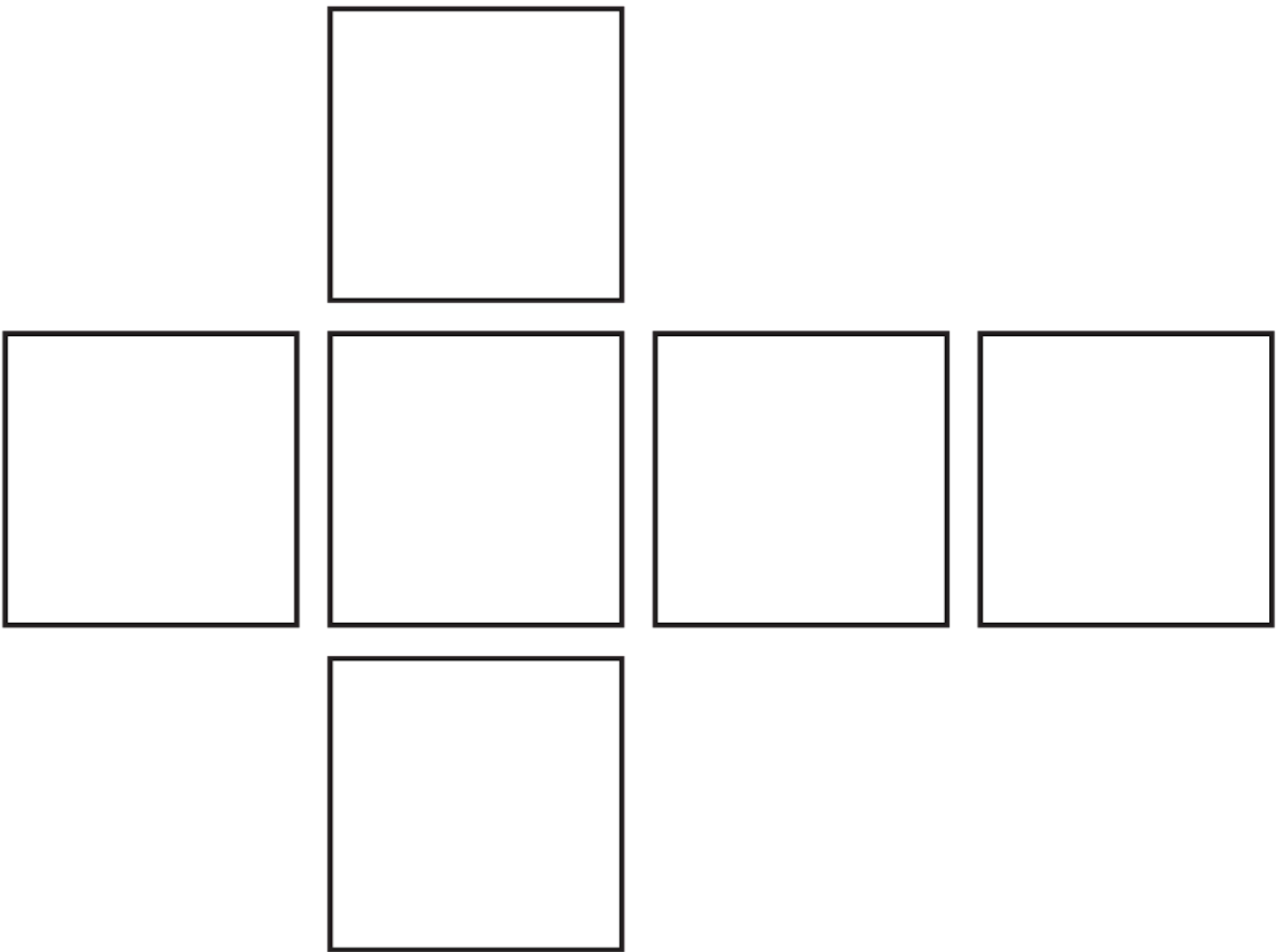
Puzzle 20: 3 Swaps



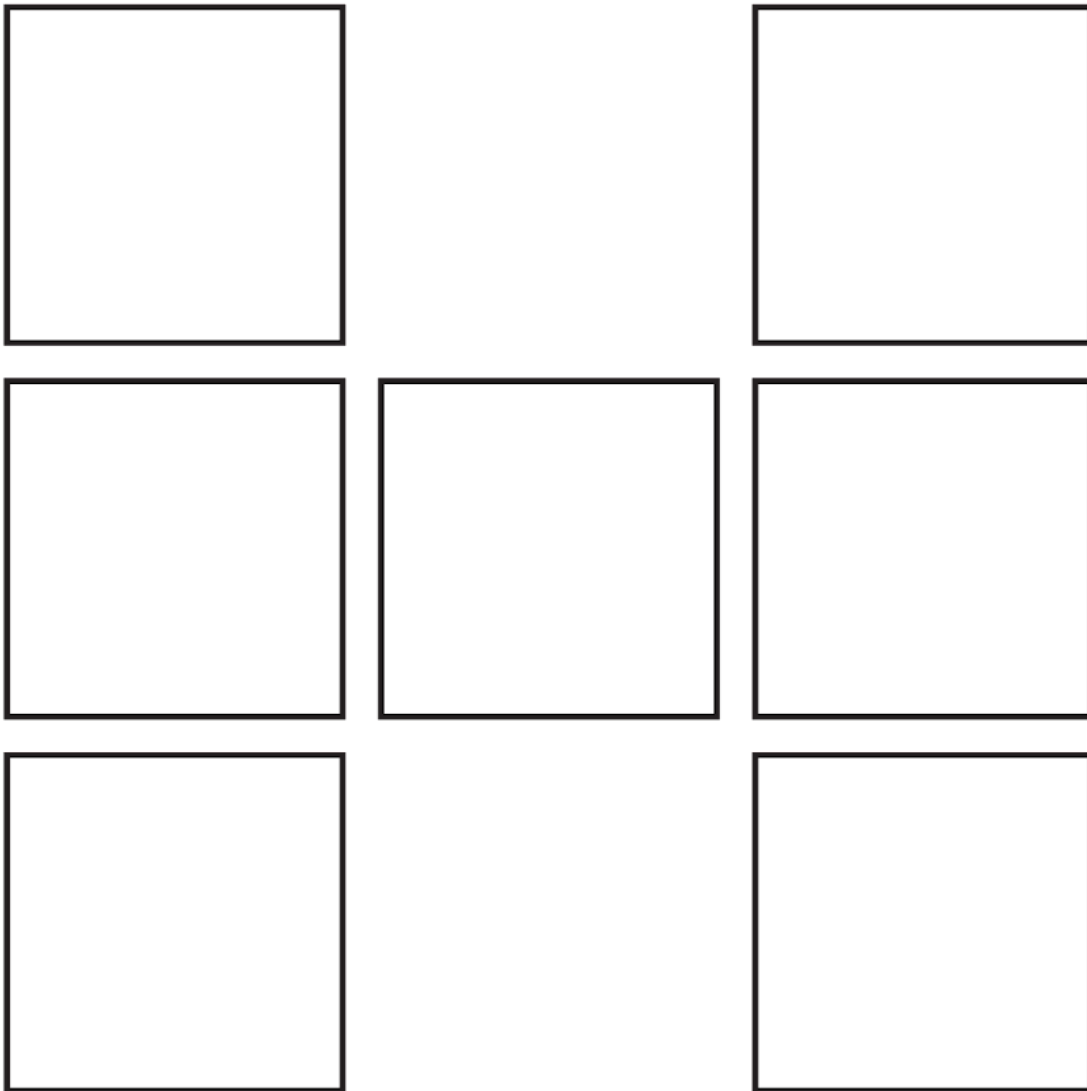
Palindrome Swap Puzzles 1-6



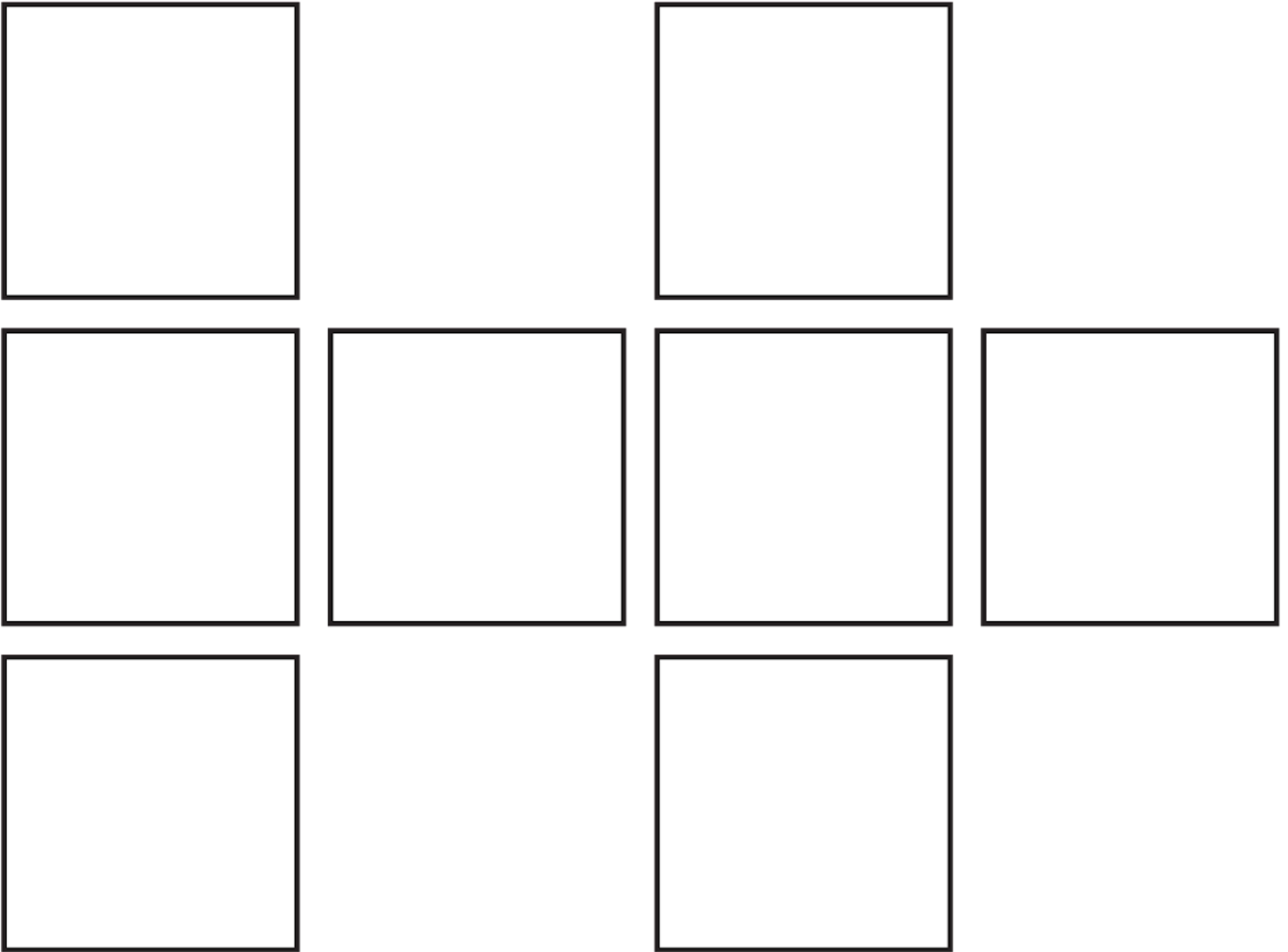
Palindrome Swap Puzzles 7-12



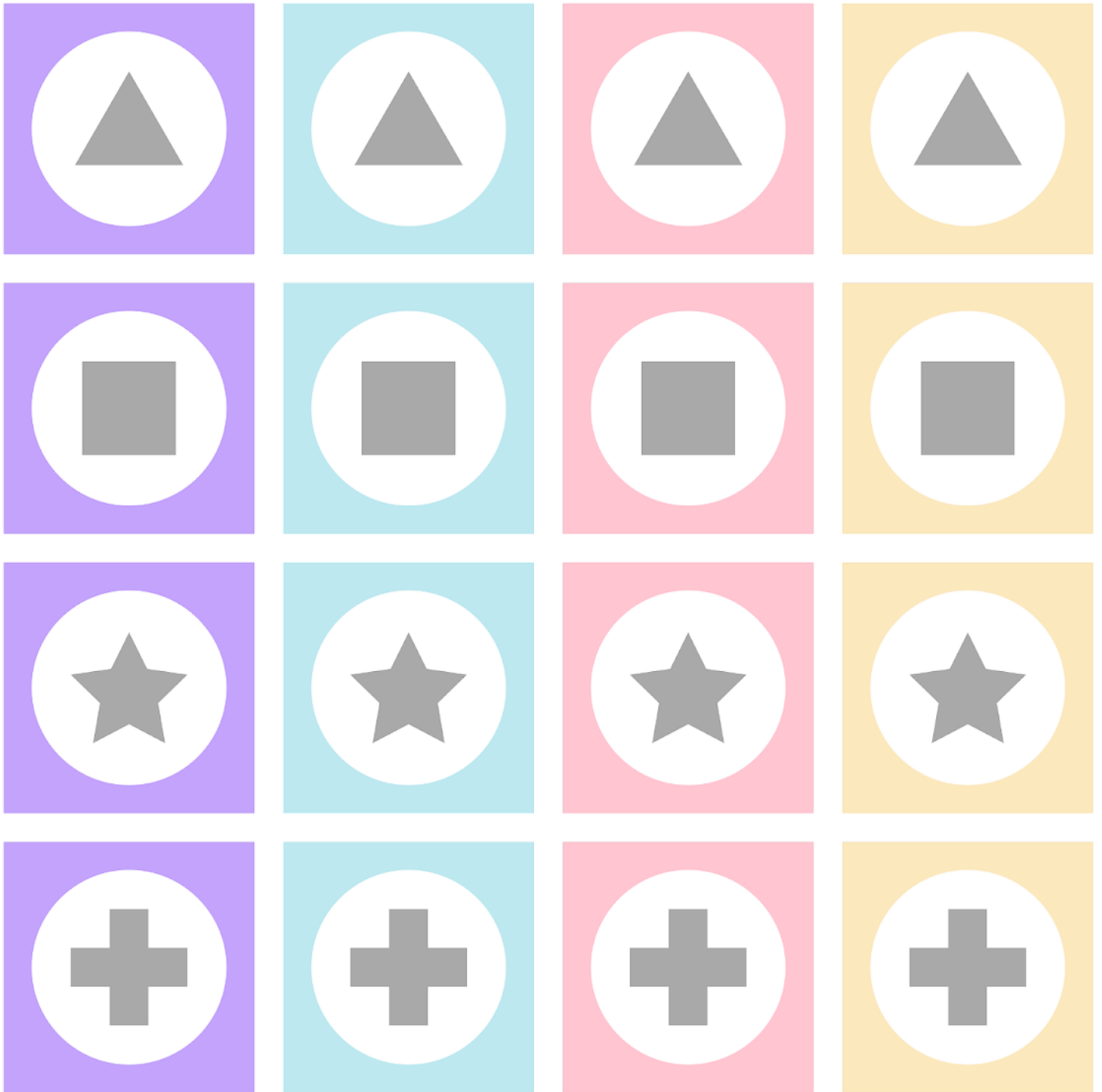
Palindrome Swap Puzzles 13-16



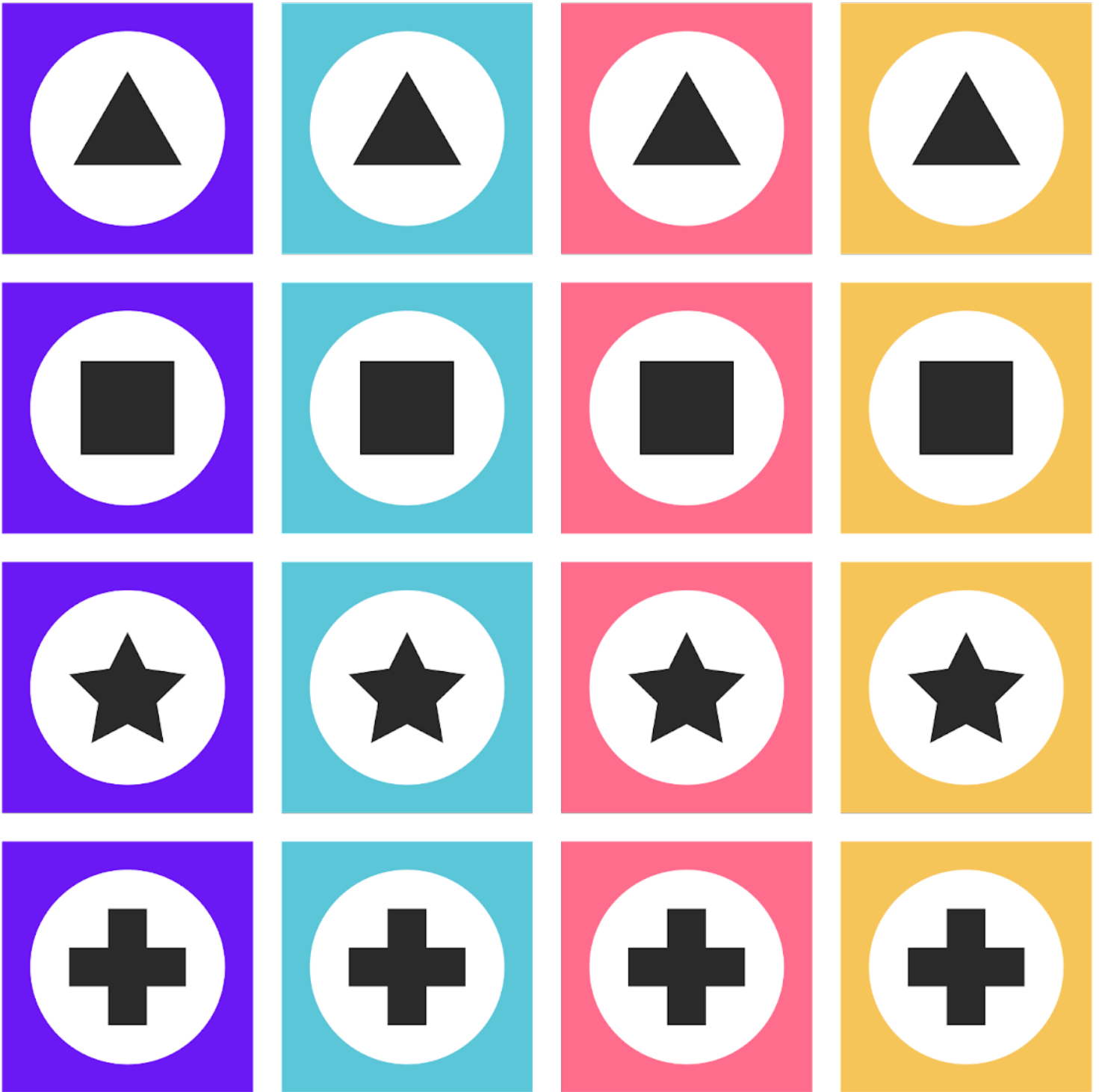
Palindrome Swap Puzzles 17-20



Palindrome Swap Mat for Cards



Palindrome Swap Cards (to cut out)





Play for free at
jrmf.org/puzzle/palindrome-swap



PALINDROME SWAP



PALINDROME SWAP



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jrmf.org/puzzle/palindrome-swap

