

# Teacher Guide

**BMC Issue:** #51, Magic Squares Redux

**Subjects:** Algebra, Number System, Group Theory

**Grade Level:** 4th grade and up

**Topics:** Addition, Tables, Symmetry, Transformations, Invariants

## Lesson Aim/Objectives:

- Work with tables, their rows, and columns
- Solve and create magic squares
- Observe patterns in magic squares
- Learn to recognize transformations and invariants in magic squares

## Common core standards:

### Seeing Structure in Expressions A-SSE

Interpret the structure of expressions. Interpret expressions that represent a quantity in terms of its context.

### Vector and Matrix Quantities N-VM

Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.

### Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
7. Look for and make use of structure.

## Materials:

- Print
  - BMC issue
- Bring
  - Pens or pencils
  - Any paper
  - Scissors (optional)

## Terms:

Algebra: table, row, column, transformation, invariant

Number System: addition, sum

Group Theory: group, symmetry, transformation

## Instructions:

1. Read activities in newsletter
2. Register for BMC meeting to get Zoom link
3. Instruct students to consider the hosts as guests in the classroom.
4. Pass out a copy of newsletter to each student.
5. Tell students we encourage participation; they should share results, drawings, and ask questions. They can show their papers to the camera.
6. Solutions, extra problems, teaching notes:  
<https://docs.google.com/document/d/1HQDZhEhwf2IzLiLnM669nYm2129DjlCh/edit?usp=sharing&oid=115334578744984922593&rtpof=true&sd=true>

## Notes:

- Test technology; if problems arise, please let hosts know.
- Use the recap issue to revisit problems in the classroom
- Provide feedback