

Teacher Guide

BMC Issue: #48, Fractal Dimension of Pomo Baskets

Subjects: Geometry, Dynamical Systems

Grade Level: 4th grade and up

Topics: Fractals, Self-Similar Shapes, Iterations, Exponent

Lesson Aim/Objectives:

- Observe shapes and patterns used in Native American art
- Model fractals with drawings and paper-folding
- Split shapes into self-similar shapes
- Explore fractal dimension

Common core standards:

Geometry 7.G

Draw, construct, and describe geometrical figures and describe the relationships between them.

HS Modeling with Geometry G-MG

Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

The Real Number System N-RN

Extend the properties of exponents to rational exponents.
Rewrite expressions involving radicals and rational exponents using the properties of exponents.

Practices

2. Reason abstractly and quantitatively.
4. Model with mathematics.
7. Look for and make use of structure.

Materials:

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

Terms:

Geometry: triangle, rectangle, curve, line segment, dimensions

Dynamical Systems: fractal, iterate, self-similar, fractal dimensions, exponents (powers)

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.

Notes:

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