Facilitation Guide

10-15 Min Station

Digital Guide

ARTS EVERY DAY IN BALTIMORE CITY PUBLIC SCHOOLS

The Nutty Architect: A Geometry Design Challenge

Explore Brain Science

VISUAL THINKING

ROUTINE OVERVIEW

In this differentiated, student-led activity, students explore photographs of unusual architecture for inspiration before creating their own abstract, playful building designs. Using grid paper, they arrange four specified quadrilaterals and a composite shape to form the foundation of their building. Students then draw and calculate the area and perimeter of each shape while incorporating architectural details and additional geometric elements into their designs.

Maryland Standards

MARYLAND STATE MATH STANDARDS

- **3.GR.C.8** - Identify perimeter as an attribute of two-dimensional figures and measure the distance around the outside of a figure by counting units or adding lengths.
- **3.GR.C.9** - Solve problems in contexts involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and finding rectangles with the same perimeter and different areas or with the same area and different perimeters.

MARYLAND ARTS STANDARDS

- **VA.AS1.I:3-5:1** - Act on creative ideas to develop personally meaningful compositions through observation, imagination, or memory.
- **VA.AS1.I:3-5:1** - Develop and experiment in the creation and design of artworks.

Not in MD? View National Standards in the Digital Guide

Getting Ready

REVEAL MATH: 3rd Grade: 11-4

ARTS INTEGRATED LEARNING OBJECTIVE(S):
By examining a variety of architectural structures, students will explore how geometric principles (including area and perimeter) inform building design and apply these concepts to create their own geometric structures.

MATH DOMAIN:

Geometric Reasoning & Measurement	Understand Concepts of Area and Perimeter	Apply concepts of area and perimeter to identify the area and perimeter of polygons using square units. Represent area and perimeter with multiplication and addition equations. Create shapes with the same area but different perimeter or the same perimeter but different area.
Number and Operation Sense	Represent and Interpret Problems Involving Multiplication and Division	Understand multiplication as equal groups or as a composed unit that can be repeated.

WHAT'S BEFORE: Area using square units, perimeter using lengths of sides

WHAT'S NEXT: Volume and mass, area and perimeter in real-world problems

MATH SKILL: Different rectangles may have the same area and different perimeters or different areas and same perimeters

ART SKILL: Reimagine buildings

MATERIALS

- Half Inch Grid, pencils, markers, color pencils, crayons
- Slides / Grading Guide / Work Sample / Independent Work / Instructions

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TEACH

Facilitation Steps

Teacher Prep:

- This differentiation activity is intended for students who showed a strong level of mastery with the main lesson on shapes with the same area and different perimeter or the same perimeter and different area. This pushes students beyond just evaluating and comparing these area/perimeter relationships and challenges them to create different shapes where these spatial relationships also apply.
- This is intended to be an independent activity that students can work on by themselves or in small groups during differentiated work time.
- Students will need access to the collection of Nutty Architecture images to gain inspiration for their creations.
- Students will also need grid paper, a copy of the Instructions page and copies of the Independent Work page.
- Refer to the Grading Guide to grade student work.

Connecting the Art:

- Provide students with the instructions that introduce them to the activity.
- Tell students that they will look at a series of images that show how architects have used creativity and geometry to design unusual - and sometimes very nutty! - buildings.

The Task:

- Once students have looked at the photos of creative buildings, students will now have the challenge of imagining and designing their own unusual structure.
- This begins with arranging 4 rectangles and a composite shape on the grid paper. These shapes are going to become the building. Students may experiment with several arrangements.
- 2 of the rectangles should have the same perimeter but different area measurements, and the other 2 should have the same area but different perimeter measurements.
- Students will be asked to label - on the Independent Work paper - the area and perimeter of each shape, along with equations that show the math of their shapes' dimensions.
- Once the shapes are in place, students can add several architectural and geometric (and possibly abstract) elements such as windows, doors, trees, circles, triangles, clouds, smiles, ears, guitars, etc. Anything that builds on their design and shows a high level of creativity and nuttiness.
- There are two "nutty" examples in the slides.

Teacher Note: *To help facilitate teacher grading of student work, students should color the two rectangles with the same perimeter the same color, and they should color the rectangles that share the same area a different color. This is indicated in student Instructions and on student Independent Work papers but students could benefit from a teacher reminder as well.*



SLIDES



VIDEO PLAYLIST



MATERIALS
GOOGLE FOLDER

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Assessment & Reflection

Student work will be collected. Looking on the side of the page, the teacher will see how students were able to calculate the area and perimeter to meet the expectations of the assignment. The design of the building should speak for itself.

Differentiation

This extension activity is intended for students who have grasped the objective and are ready to explore different applications of this skill through a real-world scenario.

Students could add more composite shapes to their drawing if they are able to do so.