# Facilitation Guide

5-7 Min Routine

Digital Guide

ARTS EVERY DAY IN BALTIMORE CITY PUBLIC SCHOOLS

Explore Brain Science

VISUAL THINKING

## Geometry in Photography

# ROUTINE OVERVIEW

In this entry point to the lesson, students will examine three photographs and identify as many geometric shapes, elements, and concepts as possible through a guided discussion. While students evaluate the photographs for their geometric connections, the provided questions will encourage them to evaluate core photographic principles, such as light, composition, and emotion. This activity will encourage review of previously covered geometric concepts, assess student understanding, and begin directing the focus to the concepts of parallel and perpendicular lines.

## Maryland Standards

**MARYLAND STATE MATH STANDARDS**

- **4.GR.C.8** - Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

**MARYLAND ARTS STANDARDS**

- **VA.AS7.E:3-5:1** - Analyze components in visual imagery that convey messages and compare personal interpretations.
- **VA.AS8.E:3-5:2** - Interpret art through contextual information.

***Not in MD? View National Standards in the Digital Guide***

## Getting Ready

**REVEAL MATH: 4th Grade: 14-4, Unit 14**

**ARTS INTEGRATED LEARNING OBJECTIVE:**
Students will analyze photographs and identify the obvious and subtle geometric shapes and concepts, reflecting on how the artist used lines and other geometric attributes to bring emotion to a photograph.

**MATH DOMAIN:**

| | | |
|---|---|---|
| Geometric Reasoning & Measurement | Draw and Identify Lines and Angles and Classify shapes by Properties of Their Lines and Angles | Describing shapes by identifying the properties of their lines, angles and other geometric attributes. |

**MATERIALS**

- Slides or printed photos (*Note: Teachers can print images if they prefer students to have a copy for discussion*)

**WHAT'S BEFORE:** Placing shapes in categories; understanding basic components of geometric shapes

**WHAT'S NEXT:** Using understandihng of parallel and perpendicular lines to classify polygons

**MATH SKILL:** Identify geometric attributes and properties in 2D figures.

**ART SKILL:** Discuss photographic composition, color choices and mood

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## TEACH

Facilitation Steps

**Teacher Prep:**

- The three photos included in the slides can be printed for individual or small group use or projected on the screen for a classroom discussion.
- Begin by explaining that you'll be looking at three photographs to find geometric shapes and attributes in them.
- You'll also be asking questions about the photos themselves in order to get a greater sense of composition and an understanding of how we might begin to see geometry all around us!
- Teachers can decide to use all questions in their discussion or can be selective based on what fits best for their classroom.
  - *Note: These question sequences were carefully scaffolded to address both the math and art connections inherent in the images.*
- Teachers can also choose to use these photos and question sequences across multiple lessons, choosing to focus on different geometric elements depending on the focus of each lesson.

**The Math:**

- This math discussion is meant to launch a lesson on parallel and perpendicular lines. The questions are meant to steer students towards observations of lines in the images and how they interact with each other in space. There are also plenty of opportunities for the teacher and students to review other geometric concepts and elements that have been covered at this point in the curriculum or in previous grades (points, angles, lines, polygons, shapes, quadrilaterals).

**Guided Discussion:**

Image 1 (slides 2 & 3) - Purposeful Questioning:

- What do you notice?
- What do you wonder?
- Where do you see light and shadows?
- How do the light and shadow impact the geometry we see in this photograph?
- What geometric elements do you see?
- How does this photo make you feel?
- Why do you think this is called "Enjoying the View?"
- Would you see something like this in your neighborhood?
- If the people were not there, would you understand the space in this photo? Why?
- How do light and shadow create angles in this photo?
- What kind of angles do the shadows make?



SLIDES



MATERIALS
GOOGLE FOLDER

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## TEACH

**Facilitation Steps**

Image 2 (slides 4 & 5)

- Where do you see angles? Lines? Shapes?
- How does the artist use light and shadow to define the geometry that we see?
- How do the lines in this photo interact with each other?
- What is the mood of this photo? Festive? Lonely? Quiet? Excited? Thoughtful?
- This photo is part of a collection called the Museum Series. Over a 20 year period, the photographer took pictures of herself in a black dress outside different arts buildings around the world. She was inviting the viewers (us!) to think about who is invited inside and who is not. She said "I think it's critical to consider how we occupy space—what spaces we are invited into, what spaces we are barred from entering..." Why do you think she would say that?

Image 3 (slides 6 & 7)

- How does this artist use lines to create a sense of space?
- How do lines divide the space?
- How do lines define a shape?
- How do lines lead the viewer's eye to the main idea?
- Are the lines all the same quality? Straight, curved? Thick, thin? Vertical, horizontal?
- How do the lines create a feeling?
- Could you draw a line (in the air with your finger) with angles that imitate the pose of the man?
- Who is that man?
- What feelings do his pose and the empty setting create?

**Assessment & Reflection**

**Formative Assessment:**

- Listen to student responses as they observe and analyze the photographs. Clear up misconceptions and see where there are opportunities to connect the conversation to the rest of the lesson on perpendicular/parallel lines, as well as any prior or future lessons.
- Make note of student noticings and observations of geometric elements to assess prior knowledge.

# TEACH

Differentiation

**5.GR.B.2**
Explain that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category (e.g., all rectangles have four right angles and squares are rectangles, so all squares have four right angles).

**5.GR.B.3**
Classify two-dimensional figures based on properties.
a. Classify triangles based on properties (e.g., angle measure, side lengths).
b. Classify quadrilaterals in a hierarchy based on properties (e.g., side lengths, angle measures, presence of parallel or perpendicular sides).

**5th Grade Alignment Opportunity:**
Since this activity is meant to be a launch for a 4th grade lesson on parallel and perpendicular lines, it encompasses a variety of geometric concepts as a review of previously learned content. The photographs have many different polygons that can be identified within them, therefore this makes this very applicable to 5th grade geometric standards that focus on the categorization of polygons based on those same attributes.

**Reveal Lesson Opportunities:**
Grade 5: Lessons 13-4, 13-5, 13-6