

Mondrian in Motion: Parallel and Perpendicular Lines

Description: Students construct parallel and perpendicular lines to create virtual artwork in the style of the painter Piet Mondrian. They also explore the properties of two parallelograms, the square and rectangle. As students manipulate their constructions, they change the orientation of the lines and note that parallel or perpendicular lines need not be oriented vertically and horizontally.

Technology Strength: Creating an artistic work that can be brought to life through animation is highly engaging. As students construct and manipulate the dynamic model, they actively develop spatial visualization skills and their understanding of parallel lines, perpendicular lines, and parallelograms.

Objectives: Define, identify, and construct parallel and perpendicular lines; observe that the opposite sides of parallelograms are parallel and that parallelograms include the square and rectangle; understand that parallel or perpendicular lines need not be oriented vertically and horizontally

Prerequisites: Knowledge of the definitions of a line and a point; some initial experience with parallel lines and perpendicular lines; beginning familiarity with attributes of quadrilaterals and, specifically, squares and rectangles

Suggested Grade Level: 3 to 5

Sketchpad Level: Intermediate

Suggested Duration: 45 minutes

Suggested Classroom Setting: Whole Class, Student Pairs. This activity, designed for use by student pairs, can be easily modified for whole-class use.

Preparation: Review the Activity Notes. See the presentation sketch for an example of completed student work. Work through the steps on the worksheet and make a copy of the worksheet for each student. Using the Internet, gather images of Piet Mondrian's paintings of the type students create in this activity.

Materials: Flash drive (optional)

Student Worksheet(s): Mondrian in Motion

Student Sketch: Mondrian in Motion.gsp

Presentation Sketch: Mondrian in Motion Present.gsp

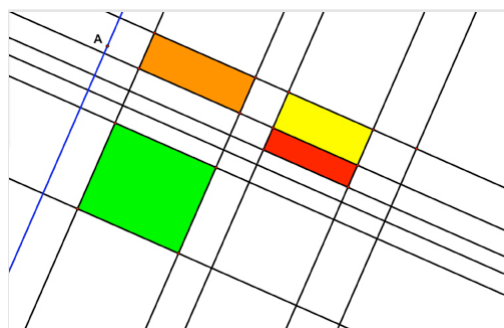
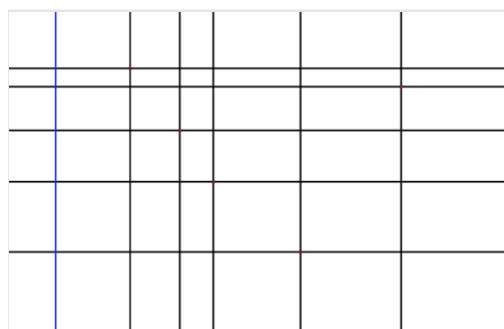
Vocabulary: Adjacent side, intersection, opposite side, orientation, parallel, parallelogram, perpendicular, proportion, quadrilateral, right angle, vertex and vertices

Sketchpad Version: GSP5

Using the Sketch:

To start, students are presented with a vertical blue line. They place five points in the blank space to the right of the line and then construct lines through those points and parallel to the blue line. Next, students construct lines through the same points and perpendicular to the blue line. Their sketches now resemble the first illustration at right.

Students construct and color a few of the quadrilaterals created by the lines. As they do, they notice characteristics of the quadrilaterals. Could any be trapezoids? Squares? What is true about all of these quadrilaterals?



Sketch Tips:

Sketch Tips show skills needed in this activity, and the step at which the skill is first used.

Sketch Tip	Tip Sheet or Tip Video
Step x: Undo actions using Edit Undo	Undoing and Redoing
Step x: Hide an object using Display Hide	Deleting and Hiding
Step 1: Open, print, and save a document	Working with Documents
Step 1: Change to a different page using page tabs	Moving Between Pages
Step 2: Construct a point on an object with the Point tool	Using the Point Tool
Step 3: Construct a parallel line using Construct Parallel Line	Constructing Parallels and Perpendiculars
Step 4: Select, deselect, and drag objects with the Arrow tool	Using the Arrow Tool
Step 5: Construct a perpendicular line using Construct Perpendicular Line	Constructing Parallels and Perpendiculars
Step 9: Construct a polygon interior using Construct Interior	Constructing Interiors
Step 9: Color an object using Display Color	Changing Color
Step 11: Type a caption with the Text tool	Using the Text Tool
Step 12: Select all points by choosing the Point tool and then using Edit Select All Points	Selecting All
Step 12: Animate an object using Display Animate	Animating