

Meet the Parallelogram: Properties of Parallelograms

Description: Students construct a parallelogram, measure side lengths and angles, and observe that opposite sides are congruent, opposite angles are congruent, and consecutive angles are supplementary. Then they construct the diagonals, measure the distances from the vertices to the point of intersection, and discover that the diagonals bisect each other.

Technology Strength: As students change the parallelogram dynamically, they can see that opposite sides and opposite angles are congruent, that consecutive angles are supplementary, and that diagonals bisect each other, regardless of the shape of the parallelogram.

Objectives: Use parallel lines to construct a parallelogram; discover that opposite sides and opposite angles of a parallelogram are congruent; discover that consecutive angles of a parallelogram are supplementary; discover that diagonals of a parallelogram bisect each other

Prerequisites: Familiarity with the definition of a parallelogram; knowledge that the sum of the measures of supplementary angles is 180° ; understanding of what it means to bisect an object

Suggested Grade Level: 6 to 8

Sketchpad Level: Beginning

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. Work through the steps on the worksheet and make a copy of the worksheet for each student. See the presentation sketch for an example of completed student work.

Materials: None

Student Worksheet(s): Meet the Parallelogram

Student Sketch: None

Presentation Sketch: Meet Parallelogram Present.gsp

Vocabulary: Parallelogram, parallel, opposite, consecutive angles, supplementary angles, diagonal, bisect, congruent

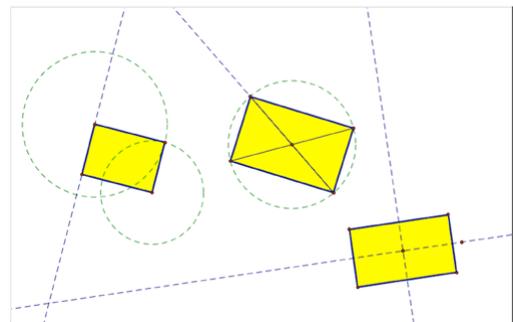
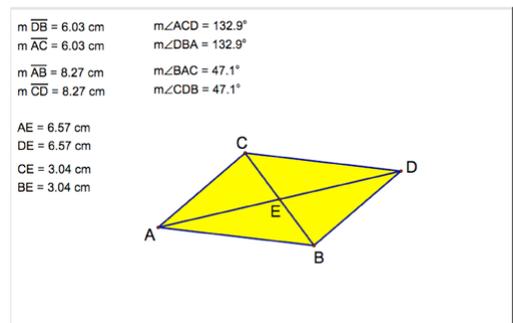
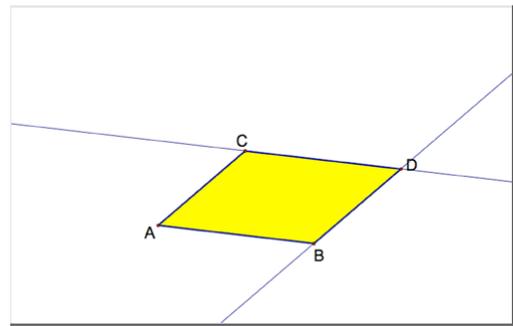
Sketchpad Version: GSP5

Using the Sketch:

To construct a parallelogram, students construct two segments that share an endpoint and parallel lines through their unshared endpoints, as shown in the first illustration. They drag the vertices to confirm that it always remains a parallelogram. Students hide the parallel lines and measure the side lengths and interior angles. By dragging the vertices, they observe that opposite sides and opposite angles are congruent, and that consecutive angles are supplementary.

Students then construct the diagonals and measure distances, as shown in the second illustration. By dragging the vertices, they observe that the diagonals bisect each other.

In the Explore More, students look for other methods of constructing a parallelogram. Some possible examples are shown in the third illustration.



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 1: Construct a segment with the Straightedge tool	Using the Straightedge Tool
Step 2: Label an object with the Text tool	Using the Text Tool
Step 3: Construct a point with the Point tool	Using the Point Tool
Step 5: Select, deselect, and drag objects with the Arrow tool	Using the Arrow Tool
Step 5: Construct a parallel line using Construct Parallel Line	Constructing Parallels and Perpendiculars
Step 8: Construct a point on an object with the Point tool	Using the Point Tool
Step 10: Hide an object using Display Hide	Deleting and Hiding
Step 13: Measure the length of a segment using Measure Length	Measuring Length and Distance
Step 14: Measure an angle by selecting three points and using Measure Angle	Measuring Angles
Step 20: Measure a distance using Measure Distance	Measuring Length and Distance