Midpoint Quadrilaterals

Description: Students connect the midpoints of a quadrilateral to construct a midpoint quadrilateral. They discover that the midpoint quadrilateral is a parallelogram and prove this conjecture.

Technology Strength: By constructing a dynamic model of a quadrilateral and its midpoint quadrilateral, students can easily investigate the properties of the midpoint quadrilateral and write conjectures about them.

Objectives: Construct a midpoint quadrilateral by connecting the midpoints of a quadrilateral; prove that a midpoint quadrilateral is a parallelogram

Prerequisites: Experience identifying parallelograms and other special quadrilaterals; knowledge that the segment connecting the midpoints of two sides of a triangle (the midsegment) is parallel to the third side and half as long

Suggested Grade Level: 9 to 10

Sketchpad Level: Beginning

Suggested Duration: 30 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): Midpoint Quadrilaterals

Student Sketch: None

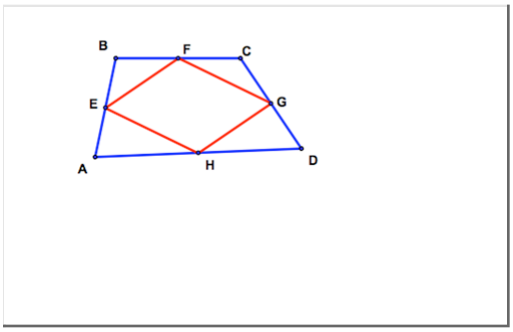
Presentation Sketch: Midpoint Quadrilateral Work.gsp

Vocabulary: Quadrilaterals, midpoint, parallelogram, diagonal

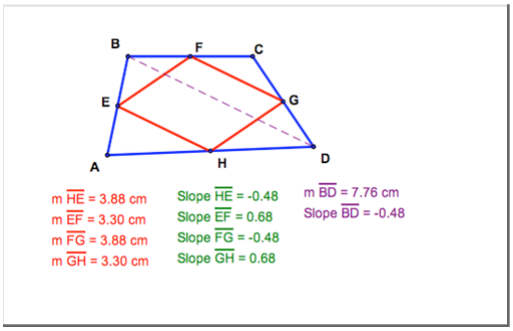
Sketchpad Version: GSP5

Using the Sketch:

Students construct a dynamic quadrilateral, labeled *ABCD*. They construct the midpoint of each side and connect these midpoints to form a midpoint quadrilateral, labeled *EFGH.* Students measure the length and slope of each of the sides of the midpoint quadrilateral, drag different parts of the original quadrilateral, and observe the measurements. Using their observations, students write a conjecture about what type of quadrilateral the midpoint quadrilateral appears to be.



Next, students construct the diagonal *BD,* measure its length and slope, drag different parts of the original quadrilateral, and observe the measurements. Using their observations, students explaining why the conjecture they previously made is true.



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 2: Construct a midpoint using **Construct | Midpoint**	Constructing Points
Step 5: Measure the length of a segment using **Measure | Length**	Measuring Length and Distance