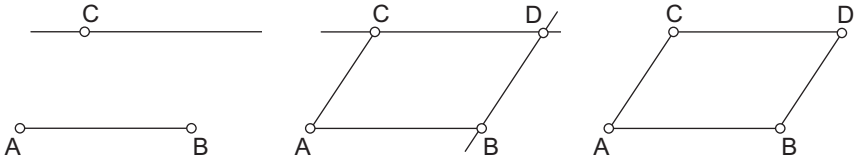
Meet the Parallelogram

For GSP5 Name:

In this activity you'll learn how to construct a *parallelogram* (a quadrilateral whose opposite sides are parallel). Then you'll discover some properties of parallelograms.

CONSTRUCT

1. In a new sketch, construct a segment.
2. Label the endpoints *A* and *B*.
3. Construct a point above $\overline{AB}$.
4. Label this point *C*.



Steps 1–5 Steps 6–9 Steps 10 and 11

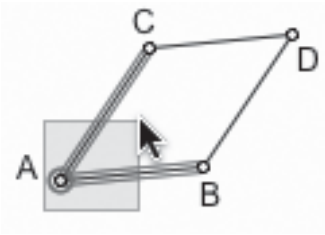
5. Now you'll construct a line through point *C* parallel to $\overline{AB}$.
   Select $\overline{AB}$ and point *C*, and then choose **Construct | Parallel Line.**
6. Construct $\overline{AC}$.
7. Construct a line through point *B* parallel to $\overline{AC}$.
8. Construct a point where the two lines intersect.
9. Label this point *D*.
10. Select both lines and choose **Display | Hide Parallel Lines.**
11. Construct the missing segments $\overline{CD}$ and $\overline{BD}$.
12. Drag different vertices of your parallelogram to make sure it's constructed properly.

EXPLORE

13. Measure the sides by selecting them and choosing **Measure | Length.**

14. Now measure the angles.

    To measure an angle, select three points with the vertex as the second point. Press and drag to make a selection rectangle as shown. Then choose **Measure | Angle.**



15. Drag different parts of the parallelogram and observe the measurements.

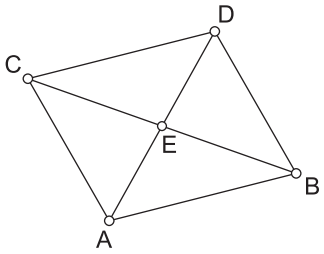
16. Write at least three conjectures about the sides and angles of a parallelogram.

CONSTRUCT

17. Construct the diagonals of the parallelogram.

18. Construct the point of intersection of the diagonals.

19. Label it point *E*.



EXPLORE

20. Drag parts of the parallelogram and observe the diagonals. Measure lengths that look as though they might be related.

    To measure a distance between two points, select the two points and then choose **Measure | Distance.**

21. Write a conjecture about the diagonals of a parallelogram.

EXPLORE MORE

22. How many ways can you construct a parallelogram? Try methods that use the Construct menu, the Transform menu, or combinations of both. Consider how you might use diagonals. Write a brief description of each construction method along with the properties of parallelograms that make that method work.