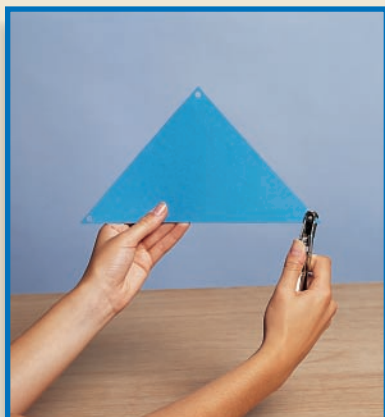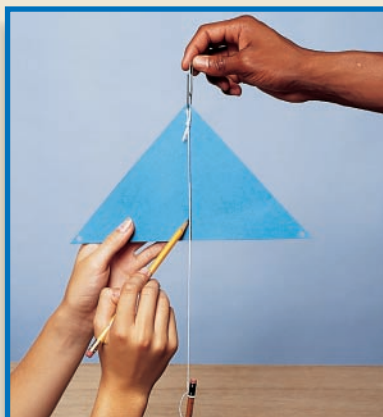# Balancing Shapes

OBJECTIVE **Explore the balancing points of triangles and other shapes.**

Materials: cardboard, straightedge, scissors, hole punch, string, paper clip, pencil with eraser

HOW TO FIND A BALANCING POINT

**1** Draw a large triangle on cardboard and cut it out. Punch holes in the triangle near the vertices.

2 Tie a weight to a string and attach the string to a paper clip. Hang your triangle from the paper clip. Mark the vertical line the string makes on the triangle.

3 Repeat Step 2 with the other holes in the triangle. The three lines should intersect near the same point. Balance the triangle by placing this point on a pencil eraser.
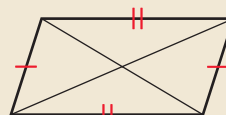
INVESTIGATION

1. Are the lines you drew in **Steps 2 and 3** *perpendicular bisectors*, *angle bisectors*, *medians*, or *altitudes* of the triangle?

2. Is the balancing point of the triangle the *orthocenter*, *incenter*, *circumcenter*, or *centroid*?

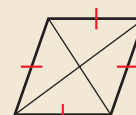3. Choose one of the following special shapes: *square, rectangle, parallelogram,* or *rhombus*.
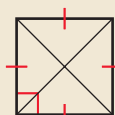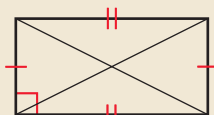
   square   **rectangle**   **parallelogram**   **rhombus**
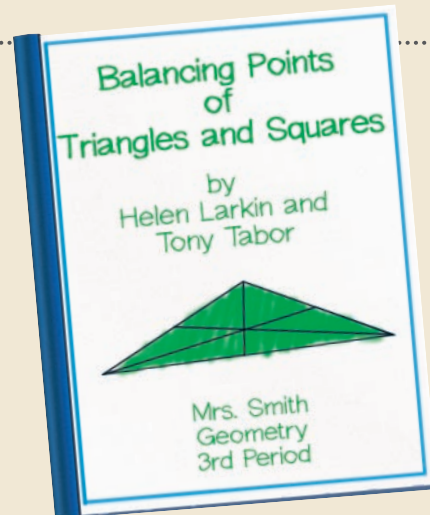
   Draw and cut out a large example of the shape you have chosen. Follow the steps above to find its balancing point.

4. Make a conjecture about the location of the balancing point in relation to the *diagonals* of the shape.

5. Test your conjecture. Then explain how you tested your conjecture and describe the results of the test.

PRESENT YOUR RESULTS

Write a report to present your results.

- Include your answers to Investigation Exercises 1–5 on the previous page.
- Include your cut-out shapes or sketches of them. Mark the balancing point of each shape.
- Describe the conjectures that you made and your reasons for believing them to be true.
- What advice would you give to someone else who is going to do this project?
- Which geometric facts did this project help you to understand better?

Balancing Points
of
Triangles and Squares
by
Helen Larkin and
Tony Tabor

Mrs. Smith
Geometry
3rd Period

You may wish to display your cut-out shapes on a poster or as a mobile. Here are some hints for creating a mobile.

- Punch a small hole at the balancing point of each shape.
- Tie a knot in a string and thread the string through the hole until the string stops at the knot.
- You can hang all of your shapes from one string, or you can hang them from several strings tied to a stick.

EXTENSION

Do you think your conjecture about balancing points of certain four-sided shapes is true for *all* four-sided shapes? Cut out and test more shapes to find out. In your report, describe your investigation and the results.

This mobile includes horizontal red and yellow plates that hang from their balancing points.