

## A TEACHER REFLECTS



### Symmetry and Parabolas

My students enjoyed discussing symmetry in the context of parabolas. In the past, they had only looked at symmetry with respect to purely geometric figures. This lesson really helped them see some connections between geometry and algebra.

I had students use the idea of symmetry as one way of checking their graphs. I asked them to fold their parabolas along the symmetry line and check if the two halves matched perfectly. Students were able to verify this easily by holding their folded graphs up to the light. If the two halves didn't match up, they knew they needed to review the points they plotted.

We had a good class discussion about why the graph of  $y = x^2$  is symmetric about the  $y$ -axis. Jacob explained it like this: "Whenever you get a  $y$ -value by plugging in some value for  $x$ , you can get the same  $y$ -value by plugging in the opposite of the value of  $x$ ." Leann added, "The points on the graph come in pairs, and the pairs are on opposite sides of the  $y$ -axis."

### Symmetry and Other Graphs

I decided to extend the discussion of symmetry by having students reflect on other functions they had studied. I first asked them if linear functions were symmetric. I gave students a chance to draw some lines on graph paper and do some folding experiments. This was an interesting challenge.

To get the class started I rephrased the question: Is there a way to fold the paper over so that the two halves of the line match up perfectly? After some exploration, students realized that any line at right angles to the given line is a line of symmetry. This brought the geometric idea of perpendicularity into the picture. Mira pointed out that the given line is also its own line of symmetry.

As a final point, I asked students about inverse variation functions. I had them look at their graphs from Lesson 3 and think about symmetry lines. I asked students how many lines of symmetry these graphs have and if they could give me their equations.

This turned out to be an interesting investigation for students. It was challenging, but accessible. When I brought the class together for a discussion, Luis summed up the results nicely. He said, "There are two lines of symmetry, and they criss-cross at the origin. When we folded the graphs along those lines, the two halves overlapped exactly." He added that his group found the equations of these lines to be  $y = x$  and  $y = -x$ .

