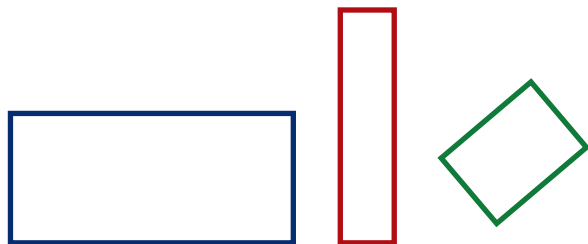


What's a Rectangle?

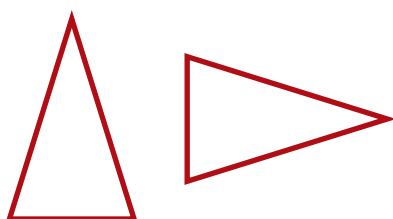
What is so hard about understanding what a rectangle is? The definition of a rectangle seems very clear to us as adults: It is a 4-sided polygon with four right angles. If we just show rectangles to students and describe what they are, will they not understand?



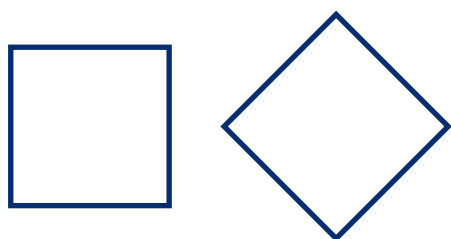
Research with students throughout the elementary grades makes it clear that understanding what a geometric object is and how it is classified does not come from learning a definition. Although students hear the definitions of rectangle and triangle all through the elementary grades—and can even repeat those definitions accurately—they still may not agree that an unusual rectangle (e.g., a square) or an unusual triangle (e.g., an obtuse triangle with three unequal sides) fits the definition. Definitions of everyday objects often depend on the perception of a typical representation.



Furthermore, although orientation is not part of the definition of any polygon, students often believe orientation matters. For example, students might recognize the polygon on the left as a triangle but call the polygon on the right “a flag.”



Some students do not believe that a square is still a square if it is rotated 45°.



These students may have implicit definitions—based on seeing many shapes presented—that a triangle or a square must be “sitting” on a side.

Similarly, students will argue that a square is not a rectangle—even though they know the definition of a rectangle—because their image of a rectangle is that one of its dimensions must be longer than the other. If they have thought of rectangles and squares as two distinct shapes in the past, students may be reluctant to say that squares are special kinds of rectangles.

In Investigation 2, students examine examples and counterexamples of rectangles. They describe, compare, and argue about what is similar and what is different among various four-sided shapes. They create rectangles on Geoboards, draw rectangles on paper, and build rectangles with square tiles. To develop an understanding of the definition, they must consider what the definition says in relation to the objects they are sorting, describing, building, and comparing. Careful observation and description are what we want students to begin to do in this unit.

Quadrilateral	
4 Sides and 4 Right Angles Rectangles	4 Sides, but Not 4 Right Angles Other Quadrilaterals