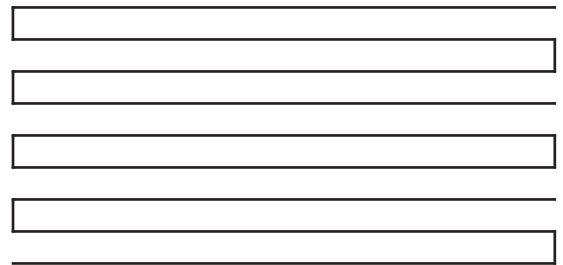
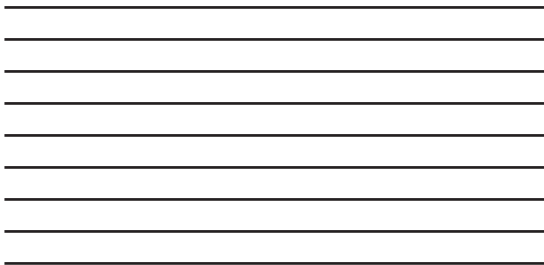


CHAPTER 3 Project
Seeing is Disbelieving!

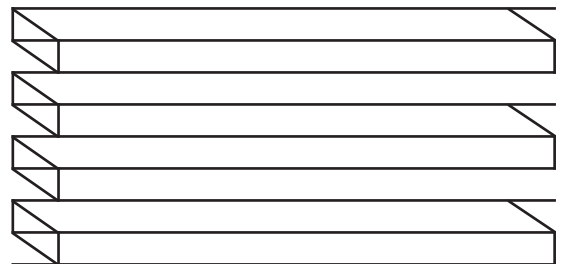
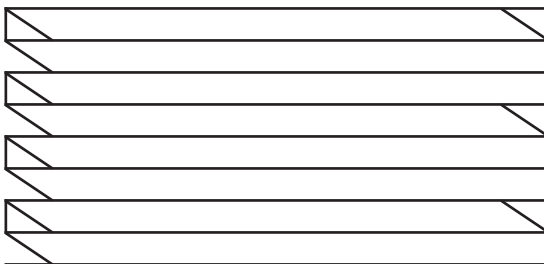
Activity 1: An Impossible Figure *Use after Lesson 3-1*

Some optical illusions consist of “impossible” figures. Follow these instructions to draw an impossible figure using parallel lines and transversals.

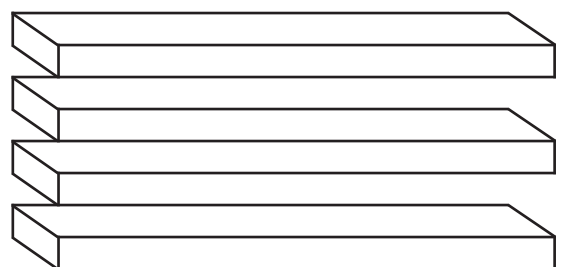
1. Use a pencil to draw nine congruent parallel segments that are about 4 in. long. The lines should be evenly spaced, with about $\frac{1}{4}$ in. between them.
2. Draw perpendicular transversals as shown to connect the endpoints of some of the segments.



3. Use a protractor to help you draw transversals that form 35° angles with the parallel lines as shown in the figure.
4. Draw four additional perpendicular transversals on the left side of the figure as shown.



5. Finish the drawing by erasing segments so that the final figure looks like the one at right. How many shelves do you see on the left side of the figure? How many shelves do you see on the right side of the figure?

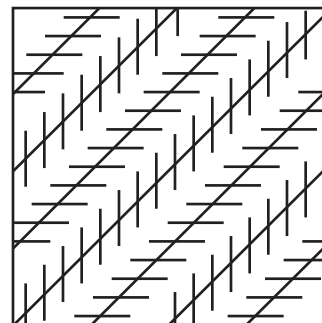


CHAPTER **Project**

3 **Seeing is Disbelieving!** continued

Activity 2: The Zöllner Illusion *Use after Lesson 3-3*

The well-known Zöllner Illusion is named after Johann Zöllner, who first drew the optical illusion in 1860.



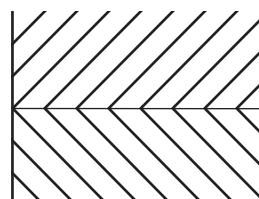
1. Study the Zöllner Illusion shown. Do the long diagonal lines appear to be parallel?

2. Choose two of the long diagonal lines. Explain how you can measure two angles in the figure to prove that the lines are indeed parallel.

Activity 3: Bending Lines *Use after Lesson 3-4*

Follow these steps to draw an optical illusion in which parallel lines appear to bend.

1. Draw a vertical line segment about 2 in. long. Then lightly draw a perpendicular bisector. (This will serve as a guideline, but it is not part of the final figure).
2. Draw a series of evenly-spaced line segments above and below the bisector that intersect the bisector at 45° angles.



3. How do you know that the diagonal lines you drew are perpendicular to each other?

4. Complete the optical illusion by drawing two lines, as shown, that are perpendicular to the vertical line. How do you know that these two lines are parallel to each other? Do they appear to be parallel?

