ANALYSIS

1. **Organizing Data** Find the time interval for the ball's motion from the edge of the table to the floor using the equation for the vertical motion of a projectile. In those equations, Δy is the vertical displacement of the ball after it leaves the table. The result is the time interval for each trial.

2. **Organizing Data** Using the time interval from item 1 and the value for *Displacement* Δx, calculate the average horizontal velocity for each trial during the ball's motion from the edge of the table to the floor.

3. **Constructing Graphs** Plot a graph of average horizontal velocity versus height of release. You may use graph paper, a computer, or a graphing calculator.

4. **Constructing Graphs** Plot a graph of average horizontal velocity versus length of travel along the plane. You may use graph paper, a computer, or a graphing calculator.

CONCLUSIONS

5. **Drawing Conclusions** What is the relationship between the height of the inclined plane and the horizontal velocity of the ball? Explain.

6. **Drawing Conclusions** What is the relationship between the length of the inclined plane and the horizontal velocity of the ball? Explain.

7. **Evaluating Methods** Why might using the vertical displacement to calculate the time interval be more reliable than using a stopwatch for each trial?

8. **Applying Conclusions** In which trials would the total velocity of the ball when it hits the ground be the greatest?

EXTENSION

9. **Designing Experiments** Design an experiment to test the assumption that the time the ball is in the air is independent of the horizontal velocity of the ball. If you have time and your teacher approves your plan, carry out the experiment.
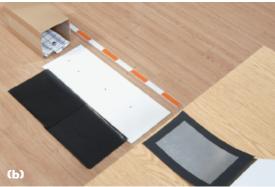

(a)

(b)

Figure 1
- Use tape to cover the sharp edges of the aluminum sheet before taping it to the end of the plane.
The aluminum keeps the ball from bouncing as it rolls onto the table.

- Use a washer hanging from a string to find the zero-displacement point directly under the edge of the table.

- Use a box lined with a soft cloth to catch the ball after it lands.