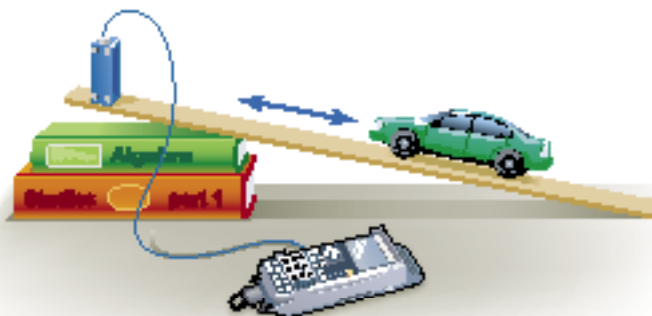


Graphing Calculator Lab

Modeling Motion

▶ SET UP the Lab

- Place a board on a stack of books to create a ramp.
- Connect the data collection device to the graphing calculator. Place at the top of the ramp so that the data collection device can read the motion of the car on the ramp.
- Hold the car still about 6 inches up from the bottom of the ramp and zero the collection device.



ACTIVITY 1

- Step 1** One group member should press the button to start collecting data.
- Step 2** Another group member places the car at the bottom of the ramp. After data collection begins, gently but quickly push the car so it travels up the ramp toward the motion detector.
- Step 3** Stop collecting data when the car returns to the bottom of the ramp. Save the data as Trial 1.
- Step 4** Remove one book from the stack. Then repeat the experiment. Save the data as Trial 2. For Trial 3, create a steeper ramp and repeat the experiment.

ANALYZE THE RESULTS

1. What type of function could be used to represent the data? Justify your answer.
2. Find the vertex of the graph. Record the coordinates in a table like the one at the right.
3. Use the TRACE feature of the calculator to find the coordinates of another point on the graph. Then use the coordinates of the vertex and the point to find an equation of the graph.
4. Find an equation for each of the graphs of Trials 2 and 3.
5. How do the equations for Trials 1, 2, and 3 compare? Which graph is widest and which is most narrow? Explain what this represents in the context of the situation. How is this represented in the equations?
6. What do the x-intercepts and vertex of each graph represent?
7. Why were the values of h and k different in each trial?

| Trial | Vertex (h, k) | Point (x, y) | Equation |
|-------|---------------|--------------|----------|
| 1 | | | |
| 2 | | | |
| 3 | | | |