

- 4. Analyzing Graphs** Based on your graph from item 3, what is the relationship between the acceleration of the cart and the accelerating force? Explain how your graph supports your answer.
- 5. Constructing Graphs** Using the data from *Trials 3–5*, plot a graph of the total mass versus the acceleration. Use a graphing calculator, computer, or graph paper.
- 6. Interpreting Graphs** Based on your graph from item 5, what is the relationship between the total mass and the acceleration? Explain how your graph supports your answer.

CONCLUSIONS

- 7. Evaluating Methods** Why does the mass in *Trials 1–3* remain constant even though masses are removed from the cart during the trials?
- 8. Evaluating Methods** Do the carts move with the same velocity and acceleration as the accelerating masses that are dropped? If not, why not?
- 9. Drawing Conclusions** Do your data support Newton's second law? Use your data and your analysis of your graphs to support your conclusions.
- 10. Applying Conclusions** A team of automobile safety engineers developed a new type of car and performed some test crashes to find out whether the car is safe. The engineers tested the new car by involving it in a series of different types of accidents. For each test, the engineers applied a known force to the car and measured the acceleration of the car after the crash. The graph in **Figure 2** shows the acceleration of the car plotted against the applied force. Compare this with the data you collected and the graphs you made for this experiment to answer the following questions.

- a. Based on the graph, what is the relationship between the acceleration of the new car and the force of the collision?
- b. Does this graph support Newton's second law? Use your analysis of this graph to support your conclusions.
- c. Do the data from the crash tests meet your expectations based on this lab? Explain what you think may have happened to affect the results. If you were on the engineering team, how would you find out whether your results were in error?

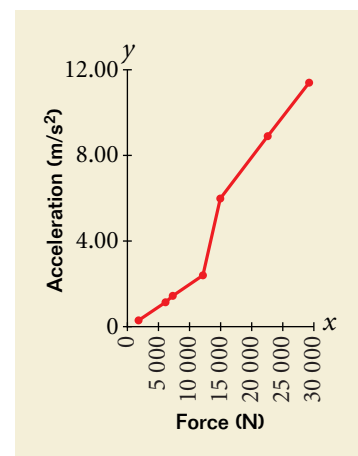


Figure 2

EXTENSION

- 11. Designing Experiments** How would your results be affected if you used the mass of the cart and its contents instead of the total mass? Predict what would happen if you performed *Trials 1–3* again, keeping the mass of the cart and its contents constant while varying the accelerating mass. If there is time and your teacher approves your plan, go into the lab and try it. Plot your data using a graphing calculator, computer, or graph paper.