Alternative Assessment

1. Can a boat moving eastward accelerate to the west? What happens to the boat's velocity? Name other examples of objects accelerating in the direction opposite their motion, including one with numerical values. Create diagrams and graphs.
2. The next time you are a passenger in a car, record the numbers displayed on the clock, the odometer, and the speedometer every 15 s for about 5 min. Create different representations of the car's motion, including maps, charts, and graphs. Exchange your representations with someone who made a different trip, and attempt to reconstruct that trip based on his or her report.
3. Two stones are thrown from a cliff at the same time with the same speed, one upward and one downward. Which stone, if either, hits the ground first? Which, if either, hits with the higher speed? In a group discussion, make your best argument for each possible prediction. Set up numerical examples and solve them to test your prediction.
4. Research typical values for velocities and acceleration of various objects. Include many examples, such as different animals, means of transportation, sports, continental drift, light, subatomic particles, and planets. Organize your findings for display on a poster or some other form.
5. Research Galileo's work on falling bodies. What did he want to demonstrate? What opinions or theories was he trying to refute? What arguments did he use to persuade others that he was right? Did he depend on experiments, logic, findings of other scientists, or other approaches?
6. The study of various motions in nature requires devices for measuring periods of time. Prepare a presentation on a specific type of clock, such as water clocks, sand clocks, pendulum clocks, wind-up clocks, atomic clocks, or biological clocks. Who invented or discovered the clock? What scale of time does it measure? What are the principles or phenomena behind each clock? Can they be calibrated?

Graphing Calculator Practice

Motion in One Dimension

At what speed does a falling hailstone travel? Does the speed depend on the distance that the hailstone falls? In this graphing calculator activity, you will have the opportunity to answer these questions. Your calculator will display two graphs: one for displacement (distance fallen) versus time and the other for speed versus time. These two graphs correspond to the following two equations:

$$Y_1 = 4.9X^2$$
$$Y_2 = 9.8X$$

You should be able to use **Table 4** of this chapter to correlate these equations with those for an accelerating object that starts from rest.

Visit go.hrw.com and type in the keyword **HF6MODX** to find this graphing calculator activity. Refer to **Appendix B** for instructions on downloading the program for this activity.