

Chapter 1 Assessment

86. During an experiment, a student measured the mass of 10.0 cm³ of alcohol. The student then measured the mass of 20.0 cm³ of alcohol. In this way, the data in Table 1-7 were collected.

Volume (cm ³)	Mass (g)
10.0	7.9
20.0	15.8
30.0	23.7
40.0	31.6
50.0	39.6

- Plot the values given in the table and draw the curve that best fits all the points.
- Describe the resulting curve.
- Use the graph to write an equation relating the volume to the mass of the alcohol.
- Find the units of the slope of the graph. What is the name given to this quantity?
- What is the mass of 32.5 cm³ of alcohol?

Mixed Review

87. Arrange the following numbers from most precise to least precise
0.0034 m 45.6 m 1234 m
88. Figure 1-26 shows the toroidal (doughnut-shaped) interior of the now-dismantled Tokamak Fusion Test Reactor. Explain why a width of 80 m would be an unreasonable value for the width of the toroid. What would be a reasonable value?



Figure 1-26

89. You are cracking a code and have discovered the following conversion factors: 1.23 longs = 23.0 mediums, and 74.5 mediums = 645 shorts. How many shorts are equal to one long?

90. You are given the following measurements of a rectangular bar: length = 2.347 m, thickness = 3.452 cm, height = 2.31 mm, mass = 1659 g. Determine the volume, in cubic meters, and density, in g/cm³, of the beam. Express your results in proper form.

91. A drop of water contains 1.7×10^{21} molecules. If the water evaporated at the rate of one million molecules per second, how many years would it take for the drop to completely evaporate?
92. A 17.6-gram sample of metal is placed in a graduated cylinder containing 10.0 cm³ of water. If the water level rises to 12.20 cm³, what is the density of the metal?

Thinking Critically

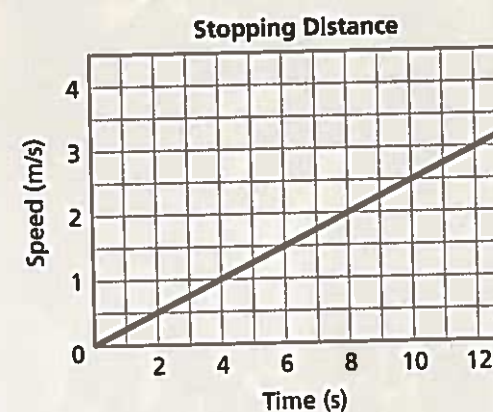
93. **Apply Concepts** It has been said that fools can ask more questions than the wise can answer. In science, it is frequently the case that one wise person is needed to ask the right question rather than to answer it. Explain.
94. **Apply Concepts** Find the approximate mass of water in kilograms needed to fill a container that is 1.40 m long and 0.600 m wide to a depth of 34.0 cm. Report your result to one significant digit. (Use a reference source to find the density of water.)
95. **Analyze and Conclude** A container of gas with a pressure of 101 kPa has a volume of 324 cm³ and a mass of 4.00 g. If the pressure is increased to 404 kPa, what is the density of the gas? Pressure and volume are inversely proportional.
96. **Design an Experiment** How high can you throw a ball? What variables might affect the answer to this question?
97. **Calculate** If the Sun suddenly ceased to shine, how long would it take Earth to become dark? (You will have to look up the speed of light in a vacuum and the distance from the Sun to Earth.) How long would it take the surface of Jupiter to become dark?

Writing in Physics

98. Research and describe a topic in the history of physics. Explain how ideas about the topic changed over time. Be sure to include the contributions of scientists and to evaluate the impact of their contributions on scientific thought and the world outside the laboratory.
99. Explain how improved precision in measuring time would have led to more accurate predictions about how an object falls.

Multiple Choice

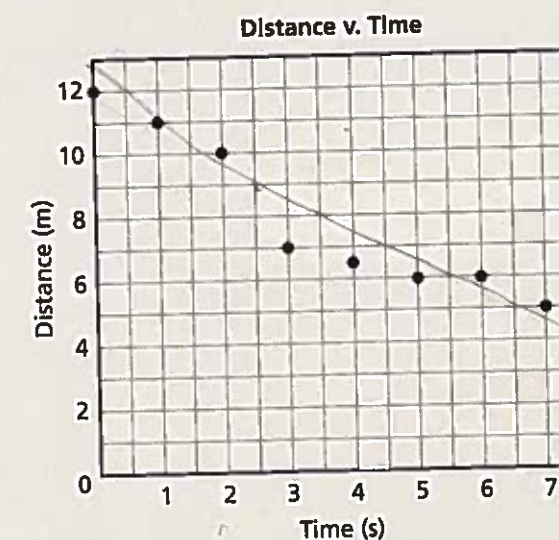
1. Two laboratories use radiocarbon dating to measure the age of two wooden spear handles found in the same grave. Lab A finds an age of 2250 ± 40 years for the first object; lab B finds an age of 2215 ± 50 years for the second object. Which of the following is true?
- Lab A's reading is more accurate than lab B's.
 - Lab A's reading is less accurate than lab B's.
 - Lab A's reading is more precise than lab B's.
 - Lab A's reading is less precise than lab B's.
2. Which of the following is equal to 86.2 cm?
- 8.62 m
 - 0.862 mm
 - 8.62×10^{-4} km
 - 862 dm
3. Jario has a problem to do involving time, distance, and velocity, but he has forgotten the formula. The question asks him for a measurement in seconds, and the numbers that are given have units of m/s and km. What could Jario do to get the answer in seconds?
- Multiply the km by the m/s, then multiply by 1000.
 - Divide the km by the m/s, then multiply by 1000.
 - Divide the km by the m/s, then divide by 1000.
 - Multiply the km by the m/s, then divide by 1000.
4. What is the slope of the graph?
- 0.25 m/s²
 - 0.4 m/s²
 - 2.5 m/s²
 - 4.0 m/s²



5. Which formula is equivalent to $D = \frac{m}{V}$?
- $V = \frac{m}{D}$
 - $V = Dm$
 - $V = \frac{mD}{V}$
 - $V = \frac{D}{m}$

Extended Answer

6. You want to calculate an acceleration, in units of m/s², given a force, in N, and the mass, in g, on which the force acts. (1 N = 1 kg·m/s²)
- Rewrite the equation $F = ma$ so a is in terms of m and F .
 - What conversion factor will you need to multiply by to convert grams to kilograms?
 - A force of 2.7 N acts on a 350-g mass. Write the equation you will use, including the conversion factor, to find the acceleration.
7. Find an equation for a line of best fit for the data shown below.



Test-Taking TIP

Skip Around if You Can

You may want to skip over difficult questions and come back to them later, after you've answered the easier questions. This will guarantee more points toward your final score. In fact, other questions may help you answer the ones you skipped. Just be sure you fill in the correct ovals on your answer sheet.