# Test 1 Practice—Fundamentals of Chemistry

**Scientific Method**

In chemistry class, Allen determined the effectiveness of various metals in releasing hydrogen gas from hydrochloric acid.  Several weeks later, Allen read that a utilities company was burying lead next to iron pipes to prevent rusting.  Allen conjectured that less rusting would occur with the more active metals.  He placed the following into 4 separate beakers of water: (a) 1 iron nail, (b) 1 iron nail wrapped with an aluminum strip, (c) 1 iron nail wrapped with a magnesium strip, and (d) 1 iron nail wrapped with a lead strip.  He used the same amount of water, equal amounts (mass) of the metals, and the same type of iron nails.  At the end of 5 days, he rated the amount of rusting as small, moderate, or large.  He also recorded the color of the water.

*Identify the:*

1. Problem
2. Hypothesis
3. Independent variable
4. Dependent variable
5. Control group
6. Observations
7. Constants

**Scientific notation:  Put the following in correct scientific notation**

8. 56 000 000 000
9. 0.000 98
10. 0.198 765

**Scientific notation:  Answer each in correct scientific notation and with correct SF:**

11. $(7.6 \times 10^{-11})\ (6.1 \times 10^{9})$

12. $\dfrac{3.58 \times 10^{-12}}{6.0 \times 10^{8}}$

13. $8.9 \times 10^{7} - 2.1 \times 10^{5}$

14. $3.29 \times 10^{4} + 1.21 \times 10^{5}$

15. $(9.8 \times 10^{-34})\ (7 \times 10^{14})$

16. $\dfrac{5.6x10^8}{3.19x10^{12}}$

**Significant figures:  Determine the number of sig figs in the following numbers:**

17. 608 cm
18. 200 kg
19. 0.007 00 m
20. 310.000 000 pg

**Sig figs:  Answer the following calculations with the correct units and sig figs:**

21. 4.5m * 3.00 m
22. 8.700cm/3.2 cm
23. 7.80 m + 4 m + 78.2 m
24. 0.64 mm – 4.3 mm - 0.200 mm

**Conversions (show all work with units!):**

25. How many micrograms are in 45.6 kilograms?
26. How many meters are in 1050 cm?
27. Convert 35.38 mL to L.
28. How many inches are in $4.5x10^{-4}$ miles? (5280 ft = 1 mi)
29. Convert 50 km/hr to cm/s.
30. The speed limit on I-25 through Castle Rock is 65 mi/hour.  Convert this to m/s.  (1 mi = 1.61 km)
31. If I drive at 45 mi/hr, how many minutes will it take me to drive 60 miles?
32. The speed of light is $3.0x10^8$ m/s.  How many hours does it take light to travel $1.2x10^5$ km?
33. How many seconds are in one century?  (1 century = 100 years, 1 year = 365 days)
34. The earth has a volume of $1.08x10^{12}$ km$^3$.  How many cubic centimeters is this?
35. A bowling ball has a volume of 5300 cm$^3$.  Determine the volume in cubic meters.

**Measurement:  Practice measuring different objects with:**

36. Graduated cylinders
37. Rulers
38. Triple beam balance