Big Chem Problem Set

CHEMISTRY SKILLS

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Memorize the elements listed at the end of this document with their corresponding symbols. You should know the symbol based on the name of the element, and the name of the element based on the symbol. You will have blitzes on this starting the second week of school.

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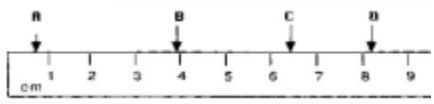
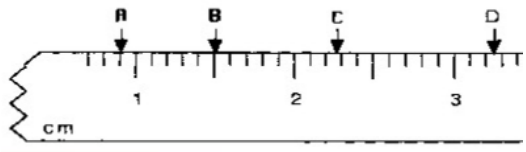
1. For each group of values listed below, write the items in order from largest to smallest. Then state whether the values represent distance, mass, or volume:
(a) 10 km, 10 pm, 10 µm, 10 dm
(b) 0.5 µL, 0.5 nL, 0.5 cL
(c) 1.2 mm, 1.2 km, 1.2 cm
(d) 3.5 cg, 3.5 g, 3.5 ng, 3.5 µg
(e) 0.25 µL, 0.25 dL, 0.25 cL
(f) 7.3 g, 7.3 pg, 7.3 kg, 7.3 mg
(g) 4 pL, 4 µL, 4 kL, 4 mL, 4 dL

2. Estimate the number of centimeters indicated by each of the arrows:



3. Estimate the number of centimeters indicated by each of the arrows:



4. Convert the following to scientific notation:
(a) 1,000,000
(b) 0.14
(c)70
(d) 0.00789

5. Convert the following to common notation:
(a) 3.00 E 8
(b) 2.0 E 5
(c) 1.26 E-6
(d) 6.350 E-5
(e) 5.1 E 0

6. Perform the following calculations. Express your answer in scientific notation:
(a) 2.1 E 3 + 2.1 E 2
(b) 3.25 E 5 – 5.2 E 3
(c) 8.7 E 6 + 3.1 E 7
(d) 9.63 E 5 + 8.81 E 4
(e) (1.3 E-4) – (5.6 E-5)
(f) (5.7 E 4) × (3.1 E 2)
(g) (4.5 E 3) ÷ (1.5 E 1)

7. Determine the number of significant digits in the following measurements, and rewrite them with the significant digits underlined:
(a) 48 cm
(b) 306.2 g
(c) 0.329 m
(d) 93.9520 degrees C
(e) 3700 mm
(f) 700. m
(g) 82.000 g

8. Perform each calculation, expressing the answer with the correct number of significant digits:
(a) 3.482 cm + 8.51 cm + 16.324 cm
(c) 80.4 cm - 16.532 cm
(d) 106.5mL - 30. mL
(e) 48.2 cm × 1.6 cm × 2.12 cm
(g) 64.34 cm3 ÷ 8.149 cm
(h) 4.93 mm ÷ 18.71 mm

9. Draw targets from a rifle range representing shooters who are: accurately precise, accurately imprecise, inaccurately precise, inaccurately imprecise.

10. Answer the questions below based on your understanding of errors:
(a) The freezing point of water is 273.2 K, but it was measured at 250.1 K. What is the percentage error?
(b) The mass of a penny is 2.67 g, but it was measured at 2.55 g. What is the percentage error?
(c) The air pressure was 101.3 kPa, but the

weatherman said it was 101.3 kPa. What is the percentage error?
(d) The amount of heat released when 1 mole of CO_2 forms is 393.5 kJ, but it was measured at 378.2 kJ. What is the percentage error?

11. Write the correct facor label setup to convert the measurements below:
(a) 35 mg = g
(b) 0.14 dL = μL
(c) 832.5 nm = μm
(d) 0.0003 L = pL

12. Show the correct factor label setup that can be used to convert the following:
(a) If 3 lumps equals 1 clump and 10 clumps equals 1 pile, how many piles are 96 lumps?
(b) If 1 byte equals 8 bits, 1 kilobyte equals 1,024 bytes, and 1 byte equals 2 nibbles, how many kilobytes is 36 nibbles? How many bits is 48 nibbles?
(c) Water has a density of 1 g/mL. This means, for water, 1 g = 1 mL. 1 kg = 1,000 g. And, 1 cm^3 = 1 mL. Find the number of milliliters (mL) in 1.6 kg of water, and find the number of kilograms (kg) in 75 mL of water.

Elements and Symbols to Memorize

1. Aluminum Al
2. Antimony Sb
3. Argon Ar
4. Arsenic As
5. Astatine At
6. Barium Ba
7. Berylium Be
8. Bismuth Bi
9. Boron B
10. Bromine Br
11. Cadmium Cd
12. Calcium Ca
13. Carbon C
14. Cerium Ce
15. Cesium Cs
16. Chlorine Cl
17. Chromium Cr
18. Cobalt Co
19. Copper Cu
20. Fluorine F
21. Francium Fr
22. Germanium Ge
23. Gold Au
24. Helium He
25. Hydrogen H
26. Iodine I
27. Iron Fe
28. Krypton Kr
29. Lead Pb
30. Lithium Li
31. Magnesium Mg
32. Manganese Mn
33. Mercury Hg
34. Neon Ne
35. Nickel Ni
36. Nitrogen N
37. Oxygen O
38. Phosphorus P
39. Platinum Pt
40. Potassium K
41. Radium Ra
42. Rubidium Rb
43. Selenium Se
44. Silicon Si
45. Silver Ag
46. Sodium Na
47. Strontium Sr
48. Sulfur S
49. Tin Sn
50. Uranium U
51. Xenon Xe
52. Zinc Zn
53. Polonium Po
54. Plutonium Pu
55. Titanium Ti
56. Neodymium Nd
57. Lanthanum La
58. Actinium Ac
59. Tungsten W
60. Vanadium V