

As an AP chemistry student, you are expected to come to this class with certain prerequisite skills. You have taken numerous science courses to reach this level and have been introduced to various general science topics such as: scientific method, metric system, units of measure, temperature scales, manipulating variables, basic atomic structure, etc. This handout is designed to detail the prerequisite skills and to help you review them. In order to do well in this chemistry course, you should know the following:

Measurement Basics

- Express measurements in SI units and prefixes. (milli-, centi-, deci-, deca-, hecto-, kilo-)
- Be able to convert between the various metric prefixes.
- Read and write numbers in scientific notation

Matter Concepts

- Be able to do temperature conversions
- Understand the concept of density and be able to solve density problems
- Be able to classify matter

Atomic Structure

- Distinguish among protons, neutrons, and electrons in terms of relative mass, charge and role in the atom.
- Describe the structure of an atom, including the location of the protons, neutrons, and electrons with respect to the nucleus
- Define atomic number, mass number (and be able to use them to determine # of proton, electrons and neutrons in an atom) and isotope
- Know the basics of the periodic table and what it tells us about the elements

Nomenclature

- Naming simple binary compounds
- Naming simple ternary compounds
- Naming acids

The Mole Concept

You should complete this on your own time over the summer. Feel free to email me questions at hboston@d230.org. If you need additional help, our class Canvas page will open in July and I can post additional support materials there. Generally, the internet has plenty of resources to assist you in reviewing the Toolbox material.

T186 (or similar)

To enter a number in scientific notation:

- Enter the coefficient
- Press the “EE” or “EXP” button
- Enter the exponent value (use the “+/-” to make it negative)

To change a number (or answer) into scientific notation (or scientific mode):

- Enter the number in standard form (or leave the answer as it is displayed)
- Press “2nd”, mode, “SCI”, then enter
- The “E” in the display means “x10”
- Press “2nd”, “FLO”, and enter to return your calculator to a floating decimal mode (normal mode)

To enter a number in scientific notation:

- Enter the coefficient
- Press “2nd” then “EE”
- Enter the exponent value (use the “+/-” button to make it negative)
- DO NOT use the number 10 with [^]. This will give you the wrong answer any time division is part of the problem

Scientific Notation

Write the following numbers in scientific notation.

1. 450, 000, 000, 000, 000
2. 0.000 000 000 000 321
3. 3186
4. 0.091 70
5. 850,010

Express the following in standard notation.

6. 3.98×10^{-6}
7. 7.002×10^5
8. 4×10^3
9. 6.0×10^{-2}
10. 3.6×10^4

Perform the following calculations and write your answers in scientific notation. Practice using your calculator

11. $(4.1 \times 10^5) \times (3.21 \times 10^4)$
12. $(5.87 \times 10^{-2}) - (4.32 \times 10^{-4})$
13. $(4.98 \times 10^{19}) + (3.12 \times 10^{17})$
14. $(5.43 \times 10^{-23}) / (2.34 \times 10^{23})$
15. 0.50449×3516.716

Classification of Matter

Chemical and physical changes: Define the following terms and describe each as a physical, chemical, or nuclear change

1. dissolving
2. decomposition
3. evaporation
4. sublimation
5. phase change
6. synthesis
7. condensation
8. fission
9. electrolysis
10. radioactivity
11. immiscible
12. combustion
13. distillation
14. diffusion
15. neutralization
16. oxidation
17. fusion
18. precipitation
19. dilution

Atomic Structure

1. Name three subatomic particles that make up the atom. Complete the chart below.

Subatomic Particle	Charge	Relative Mass	Location in the Atom	Role in the atom	How to determine # of particle in 1 atom

2. Define the following:

atomic number:

mass number:

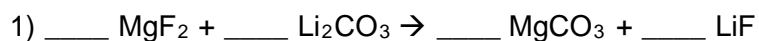
isotope:

determine the # of proton, electron and neutrons in the following three atoms:

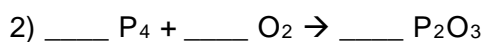
atom	p	e	n
55 Mn 25			
133 Cs 55			
58 Mn 25			

Balancing and Reaction Types

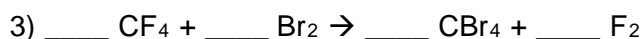
Balance the following reactions and state whether each is a synthesis, decomposition, combustion, single displacement, or double displacement reaction



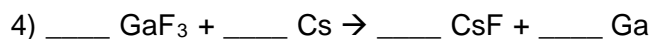
Reaction Type _____



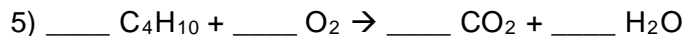
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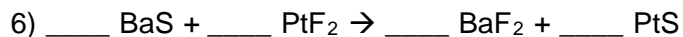
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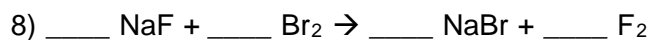
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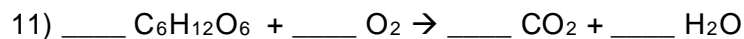
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The Mole Concept

If you don't remember how to do mole conversions, Khan Academy and Crash Course Chemistry YouTube videos are a good way to remind yourself

- 1) 2.00 moles of KCN = _____ grams KCN
- 2) 3.50 moles of NaCl = _____ formula units NaCl
- 3) 0.325 moles C₁₂H₂₂O₁₁ = _____ grams C₁₂H₂₂O₁₁
- 4) 128 grams of S = _____ moles S
- 5) 1.204 × 10²⁵ molecules of HCl = _____ moles HCl
- 6) 843 grams of NaHCO₃ = _____ moles NaHCO₃
- 7) 4.56 moles of Na₂SO₄ = _____ grams Na₂SO₄
- 8) 6.12 moles of H₂SO₄ = _____ molecules H₂SO₄
- 9) 4.88 × 10²³ molecules of BCl₃ = _____ moles BCl₃
- 10) 317.5 grams of Sn = _____ moles Sn
- 11) 1247 grams of O₂ = _____ molecules O₂
- 12) 4.25 × 10²³ formula units of PbO = _____ grams PbO

Nomenclature

If you don't remember how to name, refer to your first year chemistry materials, search online, or email me for resources. I could send you the naming flowchart and instructions. As soon as the Canvas page is published, there will be more support.

- 1) _____ Potassium iodite
- 2) _____ ZnCl_2
- 3) _____ $\text{Ca}_3(\text{BO}_2)_2$
- 4) _____ lead (II) sulfide
- 5) _____ H_2SO_4
- 6) _____ HCl
- 7) _____ B_2Cl_3
- 8) _____ copper (I) carbonate
- 9) _____ SrS
- 10) _____ ZnSO_2
- 11) _____ beryllium cyanide
- 12) _____ nitric acid
- 13) _____ HF
- 14) _____ Li_3N
- 15) _____ aluminum phosphite
- 16) _____ tin (IV) fluoride
- 17) _____ $\text{Al}(\text{OH})_3$
- 18) _____ HClO_4
- 19) _____ diphosphorus trichloride
- 20) _____ H_2S
- 21) _____ BrO_4
- 22) _____ nickel nitrite
- 23) _____ Cs_2S
- 24) _____ $\text{Pb}(\text{ClO}_3)_2$
- 25) _____ potassium oxide
- 26) _____ H_2CO_3
- 27) _____ hydrosulfuric acid
- 28) _____ SiCl_4
- 29) _____ sodium selenate
- 30) _____ magnesium fluoride
- 31) _____ $\text{Hg}(\text{ClO}_3)_2$
- 32) _____ nitrogen monoxide
- 33) _____ cesium nitride
- 34) _____ CaCr_2O_7
- 35) _____ potassium peroxide
- 36) _____ nitrous acid
- 37) _____ NaHCO_3
- 38) _____ H_3PO_4
- 39) _____ PbI_4
- 40) _____ $\text{Cu}(\text{OH})_2$
- 41) _____ iron (II) hyposulfite
- 42) _____ bromic acid
- 43) _____ potassium sulfide
- 44) _____ acetic acid
- 45) _____ KCN
- 46) _____ N_2O_5
- 47) _____ HgCl_2
- 48) _____ lead (IV) sulfide
- 49) _____ BaCO_3
- 50) _____ CO