Name:

AP Chemistry Summer Assignment

Due: First day of school

Estimated Time: 6–10 hours total across the summer

Format: Neat handwritten or typed (show work where required)

Contact: Mrs. Coleen Mikucki (cmikucki@berkscatholic.org)

Purpose of the Summer Assignment

AP Chemistry builds quickly on foundational chemistry and math skills. This assignment is designed to:

- Refresh key **chemistry concepts from prior courses**
- Strengthen **dimensional analysis and algebra**
- Introduce AP-style **thinking and problem solving**
- Develop **scientific reading and writing skills**

Required Materials

- **Periodic Table**
- Scientific calculator
- Notebook or loose-leaf paper

PART I – Chemistry Foundations Review

A. Matter and Classification

Answer in complete sentences.

1. Define and give an example of:
    - Element
    - Compound
    - Homogeneous mixture
    - Heterogeneous mixture
2. Classify each as **element, compound, homogeneous mixture, or heterogeneous mixture**:
    - Air

- Saltwater
- Bronze
- Carbon dioxide
- Milk

B. Physical vs. Chemical Properties

For each, identify whether it is **physical (P)** or **chemical (C)**:

- Density
- Flammability
- Solubility
- Reacts with acid
- Melting point

Explain why **rusting** is a chemical change.

C. Atomic Structure

Answer fully.

1. Define:
   - Proton
   - Neutron
   - Electron

1. Determine:
   - Atomic number of oxygen
   - Mass number of oxygen-18
2. What is an **isotope**?

PART II – Quantitative Skills (Show Work)

A. Dimensional Analysis

Solve each, showing conversion factors.

1. Convert **75.0 mL → L**
2. Convert **4.50 km → m**
3. Convert **2.35 g → mg**
4. Convert **72 km/hr → m/s**

B. Significant Figures

State the number of significant figures:

1. 0.00450

2. 12.30
3. 3.020×10^3

Then round each result correctly:

- 12.3456 → 3 significant figures
- 0.08976 → 2 significant figures

C. Scientific Notation

Write in scientific notation:

1. 0.000602
2. 5,920,000

Convert to standard notation:

1. 3.40×10^{-5}
2. 9.81×10^2

PART III – The Periodic Table

A. Periodic Trends

For each trend, state **what increases** and **why**:

1. Atomic radius
2. Ionization energy
3. Electronegativity

Indicate the general **direction of increase** on the periodic table.

B. Elements and Ions

1. Write the **full electron configuration** for:
    - Sodium (Na)
    - Oxygen (O)
2. Write the **noble-gas configuration** for:
    - Calcium (Ca)
3. Predict the charge of:
    - Magnesium ion
    - Nitrogen ion
    - Aluminum ion

Explain *why* these charges form.

PART IV – Chemical Bonding Basics

1. Define:
    - Ionic bond
    - Covalent bond
    - Metallic bond
2. Determine the **type of bond** between:
    - Na and Cl
    - C and O
    - Mg and O
3. Explain **why ionic compounds conduct electricity when dissolved in water**.

PART V – Reading & Written Reflection

A. Scientific Reading

Read **one** of the following

- *"Is AP Chemistry Hard?*

  https://www.savemyexams.com/learning-hub/ap-options/is-ap-chemistry-hard/

- *"Is AP Chemistry Hard? A Realistic Look at the Difficulty"*
  https://collegeprep.uworld.com/blog/is-ap-chemistry-hard/

B. Reflection (1–2 Typed Paragraphs)

Respond to **all**:

1. What do you think will make AP Chemistry different from prior science classes?
2. Which part of this assignment was most challenging for you—and why?
3. What is one skill you want to improve this year in AP Chemistry?

Academic Integrity

- This assignment must be **your own work**
- You may use notes/resources, but **copying answers is not permitted**
- Showing work earns partial credit