

Chemistry A & B Pacing Guide (2019-2020)

Unit 1: Essentials of Chemistry

Introductory ideas essential to passing the class, such as significant figures (and how to use them when collecting real lab data), lab safety & equipment, the Scientific Method (and applying it to real labs), dimensional analysis, etc.

- Experimental design
- Lab equipment and safety
- Significant figures (finding and calculating with addition and multiplication)
- Scientific Method
- Density calculations (how to re-arrange formulas) → Algebra I connection
- Dimensional analysis
- Two labs to integrate all of these concepts into one

I acknowledge that some of this is not in the standards. However, if students cannot do this (specifically significant figures when collecting and analyzing data in my lab), they will fail the first test.

Standards Covered in Part: CHEM1.PS1.2, CHEM1.PS1.11, CHEM1.PS3.4

Pacing

Friday (first full day): Introduction

Week 1: Applications of chemistry, microscopic vs. macroscopic world, lab safety, lab equipment, lab on safety and equipment, and introduction to significant figures. Friday quiz #1

Week 2: Finish significant figures and calculations, scientific method, density calculations, and various POGIL activities before Friday Quiz #2

Week 3: Scientific Method Lab, lab report completion, metric system, and dimensional analysis. Practice Exam and Exam.

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Unit 2: All about atoms

This chapter covers the beginnings of chemistry up to developments around 1900. Integrated to the core concepts (such as parts of the atom, atomic and molar mass, isotopes, basic stoichiometry, molecules, compounds, nuclear energy, etc.) are the experiments and research that led to their discovery. This enriches the content and makes it a story line.

- Famous scientists and discoveries
- Methods and research used to discover
- Isotopes
- Parts of the atom
- Molecules
- Compounds
- Nuclear energy and radiation
- Basic stoichiometry
- Average atomic mass and molar mass

Standards Covered in Part: CHEM1.PS1.1, CHEM1.PS1.2, CHEM1.PS1.3, CHEM1.PS1.11

Standards Covered: CHEM1.PS1.9, CHEM1.PS1.10

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Week 4: Radiation and nuclear energy, discoveries of parts of the atom, cathode ray tube demonstration. Friday Quiz.

Week 5: Isotopes (including project), molar and atomic mass, basic stoichiometry (applying concepts from chapter 1). Exam 2 Friday

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Unit 3: The Periodic Table

This unit provides students with a solid foundation on the Periodic Table. Students will use this information to build on concepts such as electron configurations, periodic trends, and chemical bonding. This information will also help students see how patterns exist in chemical behavior by nature of the layout of the table. Students will also learn the basic qualities behind the three main types of elements (metals, non-metals, and semimetals).

- Groups & Periods
- Metals, Non-Metals, and Semimetals
- Valance Electrons and Shells
- History of the Periodic Table
- Naming of the Elements

Standards Covered in part: CHEM1.PS1.11, CHEM1.PS1.12

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Week 6: Finish unit. No test – Friday Quiz will suffice

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Unit 4: Electronic Structure of Atoms

This chapter introduces students to quantum mechanics. First, we will cover waves, what light is, how light and electrons both behave as waves and particles, and the scientists behind these theories. Next, we will cover orbitals and electron configurations. Students will draw on their knowledge of the Periodic Table to apply this new information. The goal is for students to see how particles on the microscale interact to explain what we see and how things work on the macroscale. The laws of physics are not sufficient to explain how the world works.

- Waves
- Light/Particle Duality
- Quantum Mechanics W/ Scientists
- Electromagnetic Spectrum
- Bohr Model
- Orbitals
- Electron Configurations

Standards Covered in Part: CHEM1.PS1.11, CHEM1.PS1.12
Standards Covered: CHEM1.PS1.4

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Week 7: Waves, light particle duality, electromagnetic spectrum, Bohr model. Friday Quiz

Week 8: Orbitals, electron configurations, begin famous scientist project

Week 9: Famous scientist project

Hopefully this will take place during Homecoming week. I will move the famous scientists project to occur during that week if possible.

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Unit 5: Periodic Trends

This unit builds on many concepts learned throughout this course. The main goal is to see how the electronic structure of each individual element gives them their specific properties and how they are reflected on the Periodic Table. Later, these ideas will be applied when we study chemical bonding.

- Atomic Radius
- Ionic Radius
- Electron Affinity
- Ionization Energy
- Electronegativity

Standards Covered in Part: CHEM1.PS1.11, CHEM1.PS1.12, CHEM1.PS1.13

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Week 9: IF we finish the previous unit ahead of time, we will begin this one here

Week 10: Finish this unit and give practice exam and exam over units 4-5

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Unit 6: Intramolecular and Intermolecular Forces

This unit shows how every topic covered so far leads to chemical bonding and chemical reactions. More specifically, students will apply knowledge of the electronic structure of atoms and periodic trends to visible substances and reactions. We will cover ionic, covalent, and metallic bonding and how to name each of these types of compounds. Students will also learn how bonding affects the shape of molecules and how they attract. When chemistry B begins & students are expected to predict products from reactants they will enjoy the confidence in being able to proficiently name compounds and understand why the reaction occurs.

- Ionic, covalent, and metallic bonding
- Naming ionic and covalent compounds
- Lewis Structures
- Molecular Geometries
- Intermolecular Forces

**Standards Covered: CHEM1.PS1.12, CHEM1.PS1.13, CHEM1.PS1.14, CHEM1.PS2.1,
CHEM1.PS2.2, CHEM1.PS2.3**

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Week 11: Ionic, covalent, and metallic bonding & naming, Friday Quiz

Week 12: Molecular geometries, Intermolecular Forces, last exam

END OF CHEMISTRY A

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Standards Covered in Chemistry A

In Part

CHEM1.PS1
1, 2, 3

In Full

CHEM1.PS1
9, 10, 11, 12, 13, 14

CHEM1.PS2
1, 2, 3

CHEM1.PS3.4

CHEM1.PS4.1

Some labs will have procedures that cover standards on solutions but will not formally be covered until Chemistry B.

Standards Covered in Part Explanation: The new TN Chemistry standards are written in a way that cannot be completely covered in an individual unit. For example, in order for CHEM1.PS1.12 to be covered in one unit I would have to start with the basics of the Periodic Table and go all the way through Lewis structures. Any traditional chemistry book has these topics divided into at least 3-5 different chapters.

Chemistry B completes the rest of the TN Chemistry I standards. Those are written in a way that 3-4 standards are covered per unit. For example, there are 4 standards on solutions/solubility, which will be covered in roughly a week plus a lab.