



## The Chemistry Placement Test

This test is for placement into CHEM 1020 or CHEM 1300 and does not qualify as completion of the Chemistry 1010 course. The Chemistry Placement Test was designed based on the objectives of the Introduction to Inorganic Chemistry (CHEM 1010) course. The topics below are covered on the placement test. To register for CHEM 1300, the math prerequisite must also be met.

### Topics Covered on the Chemistry Placement Test

- Use the periodic table to determine the charge of an ion, relative atomic size, number of valence electrons, and electron configuration.
- Differentiate between hypothesis, observation, experiment, theory, and law.
- Explain the organization of electrons in an atom, including quantum numbers and orbitals.
- Describe physical and chemical properties and changes.
- Differentiate between the states of matters, including solids, liquids, gases, pure substances, heterogeneous mixtures, and homogeneous mixtures.
- Determine the formula/molar mass of a molecule or compound.
- Calculate the number of protons, neutrons, and electrons for an atom given the atomic number and mass.
- Perform calculations involving molar mass, moles, and Avogadro's number.
- Determine the significant figures in a number or measurement.
- Explain the concept of density and perform density calculations.
- Describe ionic and covalent compounds, including nomenclature, formulas, and properties.
- Determine the intermolecular forces in a species and explain the relationship between intermolecular forces and physical properties.
- Determine the Lewis structure and molecular shape of a covalent compound.
- Differentiate between polar and nonpolar bonds and relate bond polarity to molecular polarity and solubility.
- Use the gas laws to perform calculations.
- Describe the kinetic theory of gases.
- Classify reactions as a combination, decomposition, single-replacement, double-replacement, acid-base, or reduction-oxidation reactions.
- Balancing chemical equations and use a balanced equation to perform stoichiometric calculations.
- Explain the kinetics and thermodynamics of chemical reactions.
- Explain the function of a catalyst in a reaction.
- Perform thermodynamic calculations, including those involving specific heat.
- Apply LeChâtelier's principle to describe the effect of a change in conditions on chemical equilibrium.
- Explain the concepts of equilibrium and equilibrium constant.
- Describe the properties and reactions of acids, bases, conjugate acids, and conjugate bases.
- Describe the strength of an acid or base from the equilibrium constant.
- Perform calculations involving concentration, pH, and buffers.
- Describe the concepts of nuclear chemistry, including half-life, types of radiation, and the balancing of nuclear reactions.
- Describe radioactivity and identify medical uses of radioactive isotopes.