



Hilliard City Schools

Honors Chemistry

Course Proficiency Study Guide

I. Course Proficiency Purpose:

The purpose of this study guide is to aid the students who wish to take the proficiency assessment for the credit flex option. Items that the student will be required to know for proficiency will be administered in two portions. The first part of the assessment is a two hour written exam. The second part is a two hour lab.

II. Description of the Assessment Format:

- a. The written test has 100 multiple choice questions worth 100 points. The problem solving section of the exam is 10 questions equaling 55 points.
- b. The lab is 25% of the overall assessment grade equaling 52 points.

III. Proficiency Content:

a. Written Test

i. Lab Safety and Equipment:

1. *Safety Rules*
2. *Lab Equipment*
3. *Writing a Lab Report*

ii. Significant Figures and Measurement:

1. *Rules and Calculations*
2. *Metric System*
3. *Factor Label Method*

iii. Classification of Matter and Visualization:

1. *Matter-pure substance or mixture*
2. *Element or compound*
3. *Homogeneous or heterogeneous mixture; solution, colloid, suspension*

iv. Atomic Theory Past and Present:

1. *Model of the Atom; Subatomic Particles*

- v. The Periodic Table:
 - 1. *Origin*
 - 2. *Organization*
 - 3. *Trends*
 - 4. *Electron Configurations*
- vi. Intro to Mole:
 - 1. *Definition*
 - 2. *Molar Mass*
 - 3. *Simple Mole Conversions*
- vii. Ionic Bonding and Formula Writing/Naming:
 - 1. *Ion Formation*
 - 2. *Lewis Dot*
 - 3. *Formula Writing and Naming*
- viii. Covalent Bonding and Formula Writing/Naming:
 - 1. *Bond energy*
 - 2. *Electronegativity and polarity*
 - 3. *Determining whether a bond is metallic, ionic or covalent*
 - 4. *Basic Lewis Dot (obey octet rule)*
 - 5. *Formula writing and naming*
- ix. The Mole and Chemical Composition:
 - 1. *Calculating molar mass*
 - 2. *Calculating average atomic mass*
 - 3. *Calculating percent composition*
 - 4. *Finding empirical and molecular formulas*
- x. Chemical Equations and Reactions:
 - 1. *Interpreting chemical equations*
 - 2. *Balancing chemical equations*
 - 3. *Classifying reaction types*
 - 4. *Predicting products*
 - 5. *Net Ionic Equations*

- xi. Stoichiometry:
 - 1. *More complex mole conversions*
 - 2. *Mole ratio*
 - 3. *Quantitative analysis of chemical reactions*
 - 4. *Limiting Reactants*
- xii. Enthalpy and Entropy:
 - 1. **$q = m(\Delta T)C_p$**
 - 2. *Energy drives chemical reactions (endothermic and exothermic)*
- xiii. States of Matter and Intermolecular Forces:
 - 1. *State changes*
 - 2. *Relationship between energy and change of state*
- xiv. Gases:
 - 1. *Understand the nature of gases and gas laws*
- xv. Solutions:
 - 1. *Properties of solution*
 - 2. *Solution concentration*
 - 3. *Solubility of solution*
- xvi. Equilibrium:
 - 1. *Understand the nature of reversible reactions using Le Châtelier's principle*
- xvii. Acids and Bases:
 - 1. *Understand the simple and complex nature of acids and bases*
 - 2. *Acid-base titrations*

Lab: The lab is related to acid and bases. You will collect and evaluate data, including an error analysis.

NOTE! You will need a scientific calculator and goggles.

IV. Suggested Resources:

- Holt Chemistry textbook