



WTCS Repository

10-806-134 General Chemistry

Course Outcome Summary

Course Information

Description Covers the fundamentals of chemistry. Topics include scientific method, problem-solving using quantitative, characteristics of matter, periodic relationships of elements, chemical bonding, chemical reactions, chemical equilibrium, analysis of chemical substances, characteristics of aqueous solutions, acids, bases, and gas laws.

Total Credits 4

Pre/Corequisites

Prerequisite Each Wisconsin Technical College determines the General Education course prerequisites used by their academic institution. If prerequisites for a course are determined to be appropriate, the final Course Outcome Summary must identify the prerequisites approved for use by the individual Technical College.

Course Competencies

1. Perform safe laboratory practices

Assessment Strategies

1.1. Oral, Written, Graphic and/or Skill Assessment

Criteria

- 1.1. use PPE
- 1.2. follow laboratory procedures
- 1.3. locate critical safety equipment
- 1.4. select the correct equipment for specific procedures
- 1.5. locate regulatory guidelines related to the laboratory chemicals
- 1.6. follow laboratory safety procedures

2. Apply scientific method

Assessment Strategies

2.1. Oral, Written, Graphic and/or Skill Assessment

Criteria

- 2.1. apply the steps in the scientific method to problems
- 2.2. draw conclusions from your observations and/or data
- 2.3. record quantitative observations
- 2.4. record qualitative observations

3. Solve problems using quantitative data

Assessment Strategies

3.1. Oral, Written, Graphic and/or Skill Assessment

Criteria

- 3.1. use various systems of measurements
- 3.2. convert within and between systems of measurement
- 3.3. write numbers using appropriate significant figures
- 3.4. apply significant figure rules to rounding
- 3.5. convert between standard and scientific notation
- 3.6. distinguish between accuracy and precision
- 3.7. use dimensional analysis
- 3.8. calculate derived properties

4. Explain the characteristics of matter

Assessment Strategies

- 4.1. Oral, Written, Graphic and/or Skill Assessment

Criteria

- 4.1. distinguish between physical vs chemical properties
- 4.2. distinguish between physical vs chemical changes
- 4.3. distinguish between homogenous and heterogeneous mixtures
- 4.4. distinguish among the physical states of matter
- 4.5. identify changes in physical states of matter
- 4.6. distinguish between mixtures and pure substances
- 4.7. distinguish between compounds and elements
- 4.8. contrast the properties of ionic and molecular compounds
- 4.9. describe intermolecular forces

5. Analyze the periodic relationships of the elements

Assessment Strategies

- 5.1. Oral, Written, Graphic and/or Skill Assessment

Criteria

- 5.1. predict periodic trends
- 5.2. describe the basic structure of the atom
- 5.3. describe the properties of subatomic particles
- 5.4. determine the number of subatomic particles in atoms and/or ions
- 5.5. identify all parts of the isotopic symbol
- 5.6. relate isotopic symbol to subatomic particle composition
- 5.7. classify elements by their position on the periodic table

6. Describe chemical bonding

Assessment Strategies

- 6.1. Oral, Written, Graphic and/or Skill Assessment

Criteria

- 6.1. determine valence electrons for main group elements
- 6.2. apply the octet rule to chemical bonding
- 6.3. explain the formation of an ionic bond
- 6.4. use a periodic table to predict ions formed by main group elements
- 6.5. explain the formation of a covalent bond
- 6.6. use the periodic table to determine an element's bonding patterns
- 6.7. relate electronegativity differences between atoms to the type of bond they form
- 6.8. draw molecular structures

7. Explain the behavior of matter during a chemical reaction

Assessment Strategies

- 7.1. Oral, Written, Graphic and/or Skill Assessment

Criteria

- 7.1. identify evidence of a chemical change
- 7.2. determine the impact heat has on chemical processes
- 7.3. describe chemical reactions using equations

- 7.4. classify types of reactions
- 7.5. relate experimental observations to chemical changes

8. Calculate quantities of substances

Assessment Strategies

- 8.1. Oral, Written, Graphic and/or Skill Assessment

Criteria

- 8.1. apply mole concepts
- 8.2. convert between moles and particles
- 8.3. calculate molar mass
- 8.4. balance chemical equations
- 8.5. solve stoichiometry problems
- 8.6. convert between moles and grams

9. Analyze chemical substances

Assessment Strategies

- 9.1. Oral, Written, Graphic and/or Skill Assessment

Criteria

- 9.1. explain the law of constant composition
- 9.2. use chemical formulae to represent compounds
- 9.3. differentiate between ionic and molecular compounds
- 9.4. interpret ionic and molecular compounds from the formula or the name
- 9.5. apply rules of chemical nomenclature
- 9.6. change between chemical names and formulae
- 9.7. identify the seven elements that exist naturally as diatomic molecules at room temperature

10. Characterize aqueous solutions

Assessment Strategies

- 10.1. Oral, Written, Graphic and/or Skill Assessment

Criteria

- 10.1. identify the components of a solution
- 10.2. solve concentration problems
- 10.3. calculate the molar concentration of a solution
- 10.4. describe properties of solutions
- 10.5. apply solubility rules

11. Analyze acid-base chemistry

Assessment Strategies

- 11.1. Oral, Written, Graphic and/or Skill Assessment

Criteria

- 11.1. distinguish between the properties of acids and bases
- 11.2. characterize acid-base reactions
- 11.3. interpret the pH scale
- 11.4. calculate the pH of a solution
- 11.5. explain buffers

12. Characterize the behavior of gases

Assessment Strategies

- 12.1. Oral, Written, Graphic and/or Skill Assessment

Criteria

- 12.1. use the kinetic molecular theory to describe behavior of gases
- 12.2. use appropriate units of measure for state variables
- 12.3. apply the gas laws to solve problems
- 12.4. describe relationships between state variables