



## WTCS Repository

# 10-806-134 General Chemistry

## Course Outcome Summary

### Course Information

<b>Description</b>	Covers the fundamentals of chemistry. Topics include the metric system, problem-solving, periodic relationships, chemical reactions, chemical equilibrium, properties of water; acids, bases, and salts; and gas laws.
<b>Instructional Level</b>	Associate Degree
<b>Total Credits</b>	4

### Course History

<b>Last Revision Date</b>	9/17/2012
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### 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.
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### Course Competencies

#### 1. Follow accepted standards for safety and hygiene procedures in the chemistry laboratory

##### Assessment Strategies

- 1.1. on a written test
- 1.2. in lab performance

##### Criteria

*Your performance will be successful when:*

- 1.1. you identify safety equipment
- 1.2. you identify safety procedures
- 1.3. you identify laboratory equipment
- 1.4. you use Material Safety Data Sheets (MSDS)
- 1.5. you follow safety procedures when using laboratory equipment

#### 2. Examine the scientific method and tools to solve problems

##### Assessment Strategies

- 2.1. on a written test
- 2.2. on homework assignments
- 2.3. in lab assignments

## Criteria

*Your performance will be successful when:*

- 2.1. you apply the steps in the scientific method to problems
- 2.2. you record quantitative observations
- 2.3. you record qualitative observations
- 2.4. you construct models that are supported by observations
- 2.5. you draw conclusions from your observations and model

## Learning Objectives

- 2.a. Identify the steps in the scientific methods

## 3. Solve problems using measurements and conversions

### Assessment Strategies

- 3.1. on a written test
- 3.2. on homework assignments
- 3.3. in lab assignments

## Criteria

*Your performance will be successful when:*

- 3.1. you use scientific tools and methods to solve problems
- 3.2. you use the various systems of measurements
- 3.3. you convert within and between systems of measurement
- 3.4. you round off numbers
- 3.5. you write numbers using appropriate significant figures
- 3.6. you use scientific notation
- 3.7. you distinguish between accuracy and precision
- 3.8. you solve word problems
- 3.9. you determine derived properties (such as density, heat capacity, volume, area)

## 4. Explain the characteristics of matter and the changes it undergoes

### Assessment Strategies

- 4.1. on a written test
- 4.2. on homework assignments
- 4.3. in lab assignments

## Criteria

*Your performance will be successful when:*

- 4.1. you distinguish among the physical states of matter
- 4.2. you identify changes in physical states of matter
- 4.3. you distinguish between mixtures and pure substances
- 4.4. you distinguish between compounds and elements
- 4.5. you relate physical states to intermolecular forces

## 5. Analyze the periodic relationships of the elements

### Assessment Strategies

- 5.1. on a written test
- 5.2. on homework assignments
- 5.3. in lab assignments

## Criteria

*Your performance will be successful when:*

- 5.1. you explore the basic structure of the atom
- 5.2. you explore the properties of subatomic particles
- 5.3. you use the periodic table to determine the atomic symbol, atomic number, and atomic mass of an element
- 5.4. you use the periodic table to determine the electronic configuration of an atom
- 5.5. you classify an element as to metal, nonmetal, noble gas

5.6. you explain periodic relationships

## 6. Explore chemical bonding

### Assessment Strategies

- 6.1. on a written test
- 6.2. on homework assignments
- 6.3. in lab assignments

### Criteria

*Your performance will be successful when:*

- 6.1. you determine valence electrons for main group elements
- 6.2. you relate octet rule to chemical bonding
- 6.3. you explain the formation of an ionic bond
- 6.4. you use the periodic table to determine ionic charge
- 6.5. you explain the formation of a covalent bond
- 6.6. you use the periodic table to determine an element's covalence
- 6.7. you relate electronegativity differences between atoms to the type of bond they form
- 6.8. you create molecular models

## 7. Explain the behavior of matter during a chemical reaction

### Assessment Strategies

- 7.1. on a written test
- 7.2. on homework assignments
- 7.3. in lab assignments

### Criteria

*Your performance will be successful when:*

- 7.1. you differentiate between physical, nuclear and chemical changes
- 7.2. you describe chemical reactions using equations
- 7.3. you classify types of reactions
- 7.4. you relate experimental observations to chemical changes

## 8. Calculate quantities of reactants and products using balanced chemical equations

### Assessment Strategies

- 8.1. on a written test
- 8.2. on homework assignments
- 8.3. in lab assignments

### Criteria

*Your performance will be successful when:*

- 8.1. you relate atomic mass to gram molecular weight
- 8.2. you balance chemical equations
- 8.3. you use the mole concept to solve stoichiometry problems

## 9. Calculate the concentration of aqueous solutions

### Assessment Strategies

- 9.1. on a written test
- 9.2. on homework assignments
- 9.3. in lab assignments

### Criteria

*Your performance will be successful when:*

- 9.1. you explain the components of a solution
- 9.2. you calculate solution concentrations
- 9.3. you solve concentration problems
- 9.4. you explore factors affecting solubility
- 9.5. you explore colligative properties

## 10. Explain chemical equilibrium

### Assessment Strategies

- 10.1. on a written test
- 10.2. on homework assignments
- 10.3. in lab assignments

### Criteria

*Your performance will be successful when:*

- 10.1. you summarize dynamic equilibrium
- 10.2. you apply Le Chatelier's principle

## 11. Compare the characteristics of acids, bases, salts, and buffers

### Assessment Strategies

- 11.1. on a written test
- 11.2. on homework assignments
- 11.3. in lab assignments

### Criteria

*Your performance will be successful when:*

- 11.1. you distinguish between the properties of acids and bases
- 11.2. you characterize acid-base reactions
- 11.3. you examine the pH scale
- 11.4. you calculate the pH of a solution
- 11.5. you summarize how a buffer works

## 12. Solve problems involving gas laws

### Assessment Strategies

- 12.1. on a written test
- 12.2. on homework assignments
- 12.3. in lab assignments

### Criteria

*Your performance will be successful when:*

- 12.1. you explore the kinetic molecular theory
- 12.2. you use appropriate units of measure for temperature, pressure and volume
- 12.3. you apply the gas laws to solve problems