Lakeshore Technical College

78-854-773 Math Essentials for Chemistry Students

Course Outcome Summary

Course Information

Description This course provides the mathematical foundation needed for General Chemistry and is designed to support students while enrolled in both courses. Topics include reviewing the basics (fractions, decimals, integers, order of operations), solving linear equations, analyzing graphical data, computing in scientific notation, applying significant figures, converting units with dimensional analysis (metric and US systems), and using logarithms.

Total Credits 2

Total Hours 45

Types of Instruction

Instruction Type	Credits/Hours
Blended	2

Pre/Corequisites

Corequisite This course is for students currently enrolled in General Chemistry.

Textbooks

No textbook is required for this course.

Learner Supplies

TI-30XIIS Calculator (recommended) or a calculator with similar functions (fractions, scientific notation, order of operations)

Institutional Learning Outcomes

1. Use mathematics effectively

Criteria

1.1. Learner solves real world problems using mathematics
1.2. Learner measures accurately

1.3. Learner analyzes graphical information
1.4. Learner demonstrates an understanding of world measurements and foreign currency exchange

Course Competencies

1. Perform basic operations on real numbers

Linked Institutional Learning Outcomes
Use mathematics effectively

Assessment Strategies
1.1. Review Questions
1.2. Quiz

Criteria

You will know you are successful when:

1.1. you perform basic operations on whole numbers.
1.2. you perform basic operations on fractions.
1.3. you perform basic operations on decimals.
1.4. you make comparisons among whole numbers, fractions, and decimals.
1.5. you order lists containing whole numbers, fractions, and/or decimals.
1.6. you identify place values.
1.7. you round numbers to specified place values.
1.8. you perform the order of operations on paper.
1.9. you perform the order of operations using a calculator.
1.10. you solve problems involving percents.

Learning Objectives
1.a. Compare numbers in multiple forms (fractions, decimals, whole numbers)
1.b. Order numbers in multiple forms (fractions, decimals, whole numbers)
1.c. Identify place values of numbers
1.d. Perform basic operations on whole numbers
1.e. Perform basic operations on fractions
1.f. Perform basic operations on decimals
1.g. Round numbers to a given place value
1.h. Convert between fractions, decimals, and percents
1.i. Evaluate numbers in exponential form
1.j. Use the order of operations to solve multi-step problems
1.k. Compute order of operations using a calculator
1.l. Solve problems involving percents

2. Solve linear equations

Linked Institutional Learning Outcomes
Use mathematics effectively

Assessment Strategies
2.1. Review Questions
2.2. Quiz

Criteria

You will know you are successful when:

2.1. you identify like terms.
2.2. you solve one-step linear equations.
2.3. you solve linear equations with the variable on one side of the equal sign.
2.4. you solve linear equations with the variable on both sides of the equal sign.
2.5. you evaluate and check solutions to equations.

Learning Objectives
2.a. Verify solutions to equations
2.b. Combine like terms and simplify expressions
2.c. Determine whether a given equation is linear

2.d. Solve linear equations in one variable using addition principle of equality
2.e. Solve equations with variables on both sides of the equal sign
2.f. Solve linear equations using the multiplication property of equality
2.g. Solve linear equations using both the addition and multiplication properties

3. Use formulas to solve problems

Linked Institutional Learning Outcomes
Use mathematics effectively

Assessment Strategies
3.1. Review Questions
3.2. Quiz

Criteria

You will know you are successful when:
3.1. you solve equations for a specified variable.
3.2. you utilize the correct formula to solve a problem.
3.3. you find the value of a variable in a given formula.

Learning Objectives
3.a. Evaluate a problem to identify which formula is needed to solve
3.b. Use formulas to solve problems involving area
3.c. Use formulas to solve problems involving perimeter
3.d. Use formulas to solve problems involving volume
3.e. Use formulas to solve rate/distance/time problems.
3.f. Rearrange formulas to isolate a particular variable

4. Demonstrate an understanding of graphical data

Linked Institutional Learning Outcomes
Use mathematics effectively

Assessment Strategies
4.1. Review Questions
4.2. Quiz

Criteria

You will know you are successful when:
4.1. you plot ordered pairs on the coordinate plane.
4.2. you graph lines on the coordinate plane.
4.3. you find slope of a line.
4.4. you identify the x and y intercepts.
4.5. you interpret graphical data to make logical predictions.

Learning Objectives
4.a. Determine the coordinates of a given point
4.b. Plot points in the coordinate plane
4.c. Determine the quadrant for a given ordered pair
4.d. Determine whether a given ordered pair is a solution to an equation with two variables
4.e. Graph linear equations
4.f. Given an equation, find the coordinates of the x- and y-intercepts
4.g. Compare lines with different slopes
4.h. Find the slope of a line
4.i. Utilize slope-intercept form
4.j. Interpret data from a given graphical representation

5. Utilize scientific notation

Linked Institutional Learning Outcomes
Use mathematics effectively

Assessment Strategies
5.1. Review Questions

5.2. Quiz

Criteria

You will know you are successful when:

5.1. you simplify expressions using both positive and negative exponents.
5.2. you convert numbers between scientific and standard notation.
5.3. you solve basic operational problems involving numbers in scientific notation.
5.4. you correctly use the scientific mode of your calculator.

Learning Objectives

5.a. Evaluate exponential forms with integer exponents
5.b. Write scientific notation numbers in standard form
5.c. Write standard form numbers in scientific notation
5.d. Make adjustments (to both decimal and exponent) to convert numbers to scientific notation
5.e. Add numbers in scientific notation
5.f. Subtract numbers in scientific notation
5.g. Multiply numbers in scientific notation
5.h. Utilize the scientific mode on a calculator
5.i. Divide numbers in scientific notation

6. Apply the rules of significant figures

Linked Institutional Learning Outcomes

Use mathematics effectively

Assessment Strategies

6.1. Review Questions
6.2. Quiz

Criteria

You will know you are successful when:

6.1. you count the number of significant figures in a number.
6.2. you round numbers to the appropriate place value
6.3. you apply the appropriate rules for rounding based on the situation.

Learning Objectives

6.a. Count significant figures in a given number
6.b. Round numbers to the appropriate number of significant figures
6.c. Understand the rules for rounding to significant figures based on operation (addition/subtraction or multiplication/division)

7. Perform unit conversions using dimensional analysis

Linked Institutional Learning Outcomes

Use mathematics effectively

Assessment Strategies

7.1. Review Questions
7.2. Quiz

Criteria

You will know you are successful when:

7.1. you interpret units of measure within the U.S. system of measurement.
7.2. you interpret units of measure within the metric system of measurement.
7.3. you use dimensional analysis to convert within systems of measurement.
7.4. you use dimensional analysis to convert between systems of measurement.

Learning Objectives

7.a. Define units measurement (length, weight and mass, and capacity) in the U.S. system of measurement
7.b. Define units of measurement (length, weight and mass, and capacity) in the metric system of measurement
7.c. Set up a unit conversion using dimensional analysis
7.d. Solve a unit conversion using dimensional analysis

7.e. Use dimensional analysis to convert units of measurement within each system
7.f. Use dimensional analysis to convert units of measurement between each system

8. Solve problems using logarithms

Linked Institutional Learning Outcomes

Use mathematics effectively

Assessment Strategies

8.1. Review Questions
8.2. Quiz

Criteria

You will know you are successful when:

8.1. change between exponential and logarithmic forms.
8.2. correctly use the buttons on your calculator for common logarithms.
8.3. correctly use the buttons on your calculator for natural logarithms.
8.4. solve logarithmic equations.

Learning Objectives

8.a. Identify logarithmic notation
8.b. Understand the relationship between exponents and logarithms
8.c. Work with base-ten (common) logarithms
8.d. Work with base e (natural) logarithms
8.e. Calculate values using the functions of your calculator
8.f. Solve logarithmic equations