

CHEMISTRY LEARNING OBJECTIVES

I. Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.

Concepts: Stoichiometry / Equilibrium

1. The learner will use LeChatelier's principle to predict shifts in equilibrium.
2. The learner will describe conditions of equilibrium.

Process: Lab Skills

3. The learner will understand and follow safe lab procedures.
4. The learner will use lab equipment properly
5. The learner will be able to make metric measurements.
6. The learner will analyze and interpret data and communicate results.
7. The learner will be able to use dimensional analysis to solve problems.

Process: Math Skills

8. The learner will use factor-label method for conversions and problem solving.
9. The learner will use data to construct graphs.
10. The learner will interpret data from graphic information.
11. The learner will understand the purpose of significant figures
12. The learner will apply rules of significant figures in measurement and calculations when instructed.
13. The learner will have a basic understanding of metric system.

II. Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.

Concepts: Reactions / Moles

14. The learner will calculate and describe what a mole is.
15. The learner will determine molar mass.
16. The learner will convert moles to related units (mass, volume, atoms).

Concepts: Reactions / Reaction Type

17. The learner will classify reactions by type.
18. The learner will predict products of reactions.
19. The learner will use activity series to predict outcomes.

Concepts: Reactions / Balancing formulas/equations and nomenclature

20. The learner will distinguish between use of subscript and coefficient in equations.
21. The learner will write the formula of ionic and covalent compounds when given the name.
22. The learner will name ionic and covalent compounds when given the formula.
23. The learner will distinguish between reactants and products.
24. The learner will balance equations using coefficients.
25. The learner will use appropriate symbols to identify states of matter and reaction conditions.
26. The learner will distinguish between ionic and covalent compounds.

Concepts: Stoichiometry / Mass-mole Relationships

27. The learner will calculate percent composition when given a formula.
28. The learner will determine empirical and molecular formula from composition data.
29. The learner will apply law of conservation of mass in problem solving.
30. The learner will calculate and analyze relationships between reactants and products.
31. The learner will predict limiting and excess reactant.
32. The learner will calculate actual, theoretical, and percent yield.

Concepts: Stoichiometry / Thermodynamics

33. The learner will distinguish between endothermic and exothermic reactions.
34. The learner will recognize that energy is part of the balanced equation.

Concepts: Matter / Classification

35. The learner will understand different methods of classifying matter.

Concepts: Matter / Physical Properties

36. The learner will identify matter based on physical properties.

Concepts: Atom / Atomic Structure

37. The learner will determine number of protons, neutrons and electrons when given nuclear symbol.

38. The learner will appreciate the historical and technological advances that lead to the development of the modern atomic theory.

39. The learner will determine electron configuration for elements using the periodic table.

Concepts: Atom / Bonding

40. The learner will determine types of bond.

41. The learner will determine common ions from knowledge of periodic table.

42. The learner will understand energy changes associated with bonding.

43. The learner will understand basic shapes of molecules and their association with Lewis Structures.

Concepts: Atom / Periodicity

44. The learner will understand periodic law.

45. The learner will identify periodic trends of the elements on the periodic table.

46. The learner will relate periodic trends to chemical properties.

Concepts: Gas Laws / Properties of Gas

47. The learner will demonstrate conceptual understanding of relationship between moles, pressure, volume and temperature.

48. The learner will demonstrate mathematical understanding moles, pressure, volume and temperature.

Concepts: Solutions / Properties

49. The learner will describe different types of solutions.

50. The learner will identify components of solution.

51. The learner will identify variables that can change solubility.

52. The learner will understand colligative properties of a solution.

Concepts: Solutions / Concentration

53. The learner will calculate concentrations such as M, and % comp.

Concepts: Solutions/ Acid Base

54. The learner will understand and calculate pH of solutions.

55. The learner will know what a titration is.

III. Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process of diversity of life, and how living organisms interact with each other and their environment. *None purposefully written for this standard for Chemistry*

IV. Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space. *None purposefully written for this standard for Chemistry*

V. Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures, and societies. *None purposefully written for this standard for Chemistry*

VI. Students understand historical developments in science and technology

56. The learner will investigate the historical impact of chemistry and technology on society.