SCI Chemistry

Core Ideas/Crosscutting Concepts:

What is Chemistry and Matter?

Apply the steps of the scientific method.

Define chemistry.

Identify the states of matter.

Classify changes in matter as physical or chemical.

Record scientific measurements and convert them to scientific notation.

Use the metric system accurately.

Use factor-label/dimensional analysis to solve problems.

Density

Learning Targets:

Chemistry
Quantifying matter

Phases of matter

Representing compounds

Physical Science
Study of Matter

Classification of matter

Core Ideas/Crosscutting Concepts:

1. State the three laws that support the existence of atoms

2. List the five principles of Dalton's atomic theory

3. Describe the evidence for the existence of electrons, protons, and neutrons and describe the properties of these subatomic particles.

4. Discuss atoms of different elements in terms of their numbers of electrons, protons, and neutrons, and define the terms atomic number and mass number.

5. Define isotope, and determine the number of particles in the nucleus of an isotope.

6. Compare the Rutherford, Bohr, and quantum models of an atom.

7. Explain how the wavelengths of light emitted by an atom provide information about electron energy levels.

8. List the four quantum numbers, and describe their significance.

9. Write the E.C. of an atom by using the Pauli Exclusion Principle and the aufbau principle.

10. Compare the quantities and units for atomic mass with those for molar mass.

11. Define mole, and explain why this unit is used to count atoms.

12. Calculate either molar mass or number with Avogadro's number given an amount in moles.

13. Describe the historical development of the periodic table.

14. Describe the organization of the modern periodic table according to the periodic law.

15. Locate the different families of main-group elements on the P.T., describe their properties, and relate their properties to their E.C.

16. Locate metals on the P.T., describe their characteristic properties and relate their properties to their E.C.

17. Describe periodic trends in electronegativity, and relate them to the atomic structures of the elements.

18. Describe the naturally occurring elements form.

19. Explain how a transmutation changes one element into another.

20. Describe how particles accelerators are used to create synthetic elements.

Learning Targets:

Chemistry
Quantifying matter

Phases of matter

Chemistry
Structure and Properties of Matter

Atomic structure

Evolution of atomic models/theory

Electrons

Electron configurations

Periodic table

Properties

Trends

Quantifying matter

Physical Science
Study of Matter

Atoms

Models of the atom (components)

Ions (cations and anions)

Isotopes

Periodic trends of the elements

Periodic law

Representative groups

Energy and Waves

Radiant energy and the electromagnetic spectrum

Core Ideas/Crosscutting Concepts:

Simple Ions

Ionic Bonding and Salts

Names and Formulas of Ionic Compounds

Covalent Bonds

Drawing and Naming Molecules

Molecular Shapes

Learning Targets:

Chemistry
Quantifying matter

Phases of matter

Chemistry
1 Structure and Properties of Matter

Atomic structure

Electrons

Electron configurations

Periodic table

Properties

Trends

Intramolecular chemical bonding

Ionic

Polar/covalent

Representing compounds

Formula writing

Nomenclature

Models and shapes (Lewis structures, ball and stick, molecular geometries)

Physical Science
Study of Matter

Atoms

Models of the atom (components)

Ions (cations and anions)

Periodic trends of the elements

Periodic law

Bonding and compounds

Bonding (ionic and covalent)

Nomenclature

Energy and Waves

Waves

Radiant energy and the electromagnetic spectrum

Core Ideas/Crosscutting Concepts:

Avogadro's Number and Molar Conversions

Relative Atomic Mass and Chemical Formulas

Formulas and Percentage Composition

Empirical and Molecular Formulas

Learning Targets:

Chemistry
Quantifying matter

Phases of matter

Chemistry
Representing compounds

Formula writing

Interactions of Matter

Stoichiometry

Molar calculations

Physical Science
Bonding and compounds

Bonding (ionic and covalent)

Nomenclature

Core Ideas/Crosscutting Concepts:

Describing Chemical Reactions

Balancing Chemical Equations

Classifying Chemical Reactions

Writing Net Ionic Equations

Learning Targets:

Chemistry
Quantifying matter

Phases of matter

Chemistry
Intramolecular chemical bonding

Ionic

Polar/covalent

Representing compounds

Formula writing

Nomenclature

Quantifying matter

Phases of matter

Interactions of Matter

Chemical reactions

Types of reactions

Kinetics

Energy

Equilibrium

Acids/bases

Stoichiometry

Molar calculations

Physical Science
Study of Matter

Classification of matter

States of matter and its changes

Bonding and compounds

Bonding (ionic and covalent)

Nomenclature

Reactions of matter

Chemical reactions

Energy and Waves

Conservation of energy

Core Ideas/Crosscutting Concepts:

Calculating Quantities in Reactions

Limiting Reactants and Percent Yield

Stoichiometry and Cars

Learning Targets:

Chemistry
Quantifying matter

Phases of matter

Chemistry
Intramolecular chemical bonding

Ionic

Polar/covalent

Representing compounds

Formula writing

Nomenclature

Quantifying matter

Phases of matter

Interactions of Matter

Chemical reactions

Types of reactions

Kinetics

Energy

Equilibrium

Acids/bases

Stoichiometry

Molar calculations

Limiting reagents

Physical Science
Study of Matter

Classification of matter

States of matter and its changes

Bonding and compounds

Nomenclature

Reactions of matter

Chemical reactions

Energy and Waves

Conservation of energy

Core Ideas/Crosscutting Concepts:

Phase Change Diagrams

Characteristics of Gases

The Gas Laws

Molecular Composition of Gases

Learning Targets:

Chemistry
Quantifying matter

Phases of matter

Chemistry
Representing compounds

Formula writing

Nomenclature

Quantifying matter

Phases of matter

Interactions of Matter

Gas laws

Pressure, volume and temperature

Ideal gas law

Stoichiometry

Molar calculations

Physical Science
Study of Matter

Classification of matter

Properties of matter

States of matter and its changes

Core Ideas/Crosscutting Concepts:

Polarity of water compound

Characteristics of water

Molarity

Percent Solutions

Saturated and Unsaturated Solutions

Learning Targets:

Chemistry
Quantifying matter

Phases of matter

Chemistry
Structure and Properties of Matter

Intramolecular chemical bonding

Ionic

Polar/covalent

Quantifying matter

Phases of matter

Intermolecular chemical bonding

Types and strengths

Implications for properties of substances

Melting and boiling point

Solubility

Vapor pressure

Physical Science
Study of Matter

Classification of matter

States of matter and its changes

Bonding and compounds

Bonding (ionic and covalent)

Core Ideas/Crosscutting Concepts:

Characteristics of Acids and Bases

pH scale: acidity and basicity

Neutralization reactions (includes understanding of indicators and titration)

Equilibria of weak acids and bases

Learning Targets:

Chemistry

Quantifying matter

Phases of matter

Chemistry
Intramolecular chemical bonding

Ionic

Representing compounds

Formula writing

Nomenclature

Quantifying matter

Phases of matter

Interactions of Matter

Equilibrium

Acids/bases

Stoichiometry

Solutions

Physical Science
Study of Matter

Bonding and compounds

Bonding (ionic and covalent)

Nomenclature

Reactions of matter

Chemical reactions

Core Ideas/Crosscutting Concepts:

Atomic Nuclei and Nuclear Stability

Nuclear Charge

Nuclear Technology

Organic Chemistry

Nomenclature and Structure of Organic Compounds

Reactions with organic compounds

Learning Targets:

Physical Science
Study of Matter

Atoms

Models of the atom (components)

Isotopes

Reactions of matter

Nuclear reactions

Chemistry
Structure and Properties of Matter

Atomic structure

Representing compounds

Formula writing

Nomenclature

Quantifying matter

Interactions of Matter

Chemical reactions

Kinetics

Energy

Nuclear Reactions

Radioisotopes

Nuclear energy