

Course Title: Physical Science

Topic/Concept: Chapter 1 - The Nature of Science

Time Allotment: 10 days

Unit Sequence: 1

Major Concepts to be learned:

1. Scientific Method
2. Metric System
3. Observations
4. Inferences

Expected Skills to be demonstrated:

1. They will be able to identify the steps of the scientific method when solving problems.
2. They will be able to use the scientific method to solve problems.
3. They will be able to measure the mass, volume, and length of objects using the metric system.
4. They will be able to convert in the metric system.
5. They will be able to explain why the metric system is used by scientists.

PA Standards/Anchors:

Eligible Content:

S11.A.1.1
S11.A.2.1
S11.A.2.2
S11.A.3.2

- S11.A.1.1.1-5
- S11.A.2.1.1-5
- S11.A.2.2.1
- S11.A.3.2.1-3

Instructional Strategies:

Assessments:

Coooperative groups	Problem solving activities
Lecture	Performance task
Research	Written work
Hands-on activity	Note Taking
Charting	Summarizing
Outlining	Evaluating

- Tests
- Quizzes
- Homework
- Lab Reports

Course Title: Physical Science

Topic/Concept: Ch. 3 - Exploring Motion and Forces

Time Allotment: 4 days

Unit Sequence: 2

Major Concepts to be learned:

1. Identifying various forces
2. Interpreting graphs
3. Calculating speed, velocity, and acceleration
4. Comparing and contrasting force and result of force

Expected Skills to be demonstrated:

1. They will be able to compare and contrast forces and their effects on acceleration.
2. They will be able to interpret graphs.
3. They will be able to complete calculations.
4. They will be able to identify various forces.

PA Standards/Anchors:

Eligible Content:

S11.A.2.1
S11.C.3.1

- S11.A.2.1.1
- S11.C.3.1.1,3

Instructional Strategies:

Assessments:

Problem solving activities
Lecture
Performance task
Hands-on activity
Note Taking
Charting

- Quizzes
- Tests
- Lab Reports
- Homework

Course Title: Physical Science

Topic/Concept: Ch. 4 - Acceleration and Motion

Time Allotment: 16 days

Unit Sequence: 3

Major Concepts to be learned:

1. Forces: Air resistance, weight, gravity
2. Motion
3. Inertia
4. Acceleration

Expected Skills to be demonstrated:

1. Compare motion in a straight line with circular motion.
2. Define various forces.
3. Relate motion due to forces to inertia.
4. Observe effects of motion on acceleration.

PA Standards/Anchors:

Eligible Content:

S11.C.3.1

- S11.C.3.1.1,3

Instructional Strategies:

Assessments:

Cooperative groups
Problem solving activities
Lecture
Written work
Hands-on activity

- Quizzes
- Tests
- Homework
- Labs

Course Title: Physical Science

Topic/Concept: Ch. 5 - Energy

Time Allotment: 10 days

Unit Sequence: 4

Major Concepts to be learned:

1. Vocab: Kinetic and potential energy, work, heat, temperature, thermal pollution, and specific heat
2. Conservation of energy
3. Determination of thermal energy
4. Thermal pollution
5. Calculating changes in thermal energy

Expected Skills to be demonstrated:

1. Recognize and define vocabulary words.
2. Recognize conservation of energy.
3. Explain what makes up thermal energy in a sample.
4. Discuss possible solutions for thermal pollution problems.
5. Calculate changes in thermal energy.

PA Standards/Anchors:

Eligible Content:

S11.C.2.1
S11.C.2.2

- S11.C.2.1.2,3
- S11.C.2.2.1

Instructional Strategies:

Assessments:

Cooperative groups
Problem solving activities
Lecture
Group discussion
Hands-on activity
Note Taking

- Quizzes
- Tests
- Homework
- Lab work

Course Title: Physical Science

Topic/Concept: Ch. 6 - Using Thermal Energy

Time Allotment: 10 Days

Unit Sequence: 5

Major Concepts to be learned:

1. Conduction, convection and radiation
2. Insulators and conductors
3. Heat movers
4. Alternative energy sources
5. Three types of conventional heating systems

Expected Skills to be demonstrated:

1. Compare and contrast the transfer of thermal energy by conduction, convection, and radiation.
2. Differentiate between conductors and insulators and explain how each affects the transfer of energy.
3. Describe three types of conventional heating systems.
4. Describe solar and ocean uses to heat building and produce energy.
5. Describe differences in heat movers, and how they transfer energy in a direction opposite to that of its natural movement.

PA Standards/Anchors:

Eligible Content:

S11.C.2.1
S11.C.2.2

- S11.C.2.1.3
- S11.C.2.2.2-3

Instructional Strategies:

Assessments:

Problem solving activities
Lecture
Group discussion
Written work
Hands-on activity
Note Taking
Evaluating

- Quizzes
- Tests
- Homework
- Lab work

Course Title: Physical Science

Topic/Concept: Ch. 7 - Machines

Time Allotment: 14 days

Unit Sequence: 6

Major Concepts to be learned:

1. Six types of simple machines
2. Calculating mechanical advantage, ideal mechanical advantage, and efficiency
3. Work, power, and time relationships
4. Compound machines

Expected Skills to be demonstrated:

1. Identifying the six types of simple machines.
2. Calculating the mechanical advantage, ideal mechanical advantage, and efficiency.
3. Relating work, power, and time as used in making work easier.
4. Identifying simple machines in compound machines.

PA Standards/Anchors:

Eligible Content:

S11.C.3.1

- S11.C.3.1.2,5,6

Instructional Strategies:

Assessments:

Coooperative groups
Problem solving activities
Lecture
Performance task
Hands-on activity
Oral presentation
Note Taking

- Quizzes
- Tests
- Homework
- Lab work
- Presentation

Course Title: Physical Science

Topic/Concept: Ch. 8 - Solids, Liquids and Gases

Time Allotment: 10 days

Unit Sequence: 7

Major Concepts to be learned:

1. Four states of matter
2. Kinetic Theory of Matter
3. Pollution of fresh water
4. Gas laws
5. Archimedes', Pascal's, and Bernoulli's Principles

Expected Skills to be demonstrated:

1. Describe the four states of matter and use the kinetic theory of matter to explain their characteristics.
2. Identify ways fresh water is used and polluted, and methods for stopping pollution of fresh water.
3. Identify energy changes in changes of states of matter (heat of fusion and vaporization).
4. Explain how gas exerts pressure on its container, and the relationship between temperature and volume of a gas.
5. State Archimedes' Principle, Pascal's principle and Bernoulli's principle and describe ways they are applied.

PA Standards/Anchors:

Eligible Content:

S11.C.1.1
S11.C.2.2

- S11.C.1.1.2,5
- S11.C.2.2.1

Instructional Strategies:

Assessments:

Problem solving activities
Lecture
Group discussion
Performance task
Written work
Hands-on activity
Note Taking
Charting

- Quizzes
- Tests
- Homework
- Lab work

Course Title: Physical Science

Topic/Concept: Ch. 9 - Classification of Matter

Time Allotment: 14 days

Unit Sequence: 8

Major Concepts to be learned:

1. Substances
2. Mixtures
3. Mixtures in water and air pollution
4. Chemical and Physical properties and changes
5. Law of Conservation of Mass

Expected Skills to be demonstrated:

1. Distinguish between substances and mixtures.
2. Compare and contrast solutions, colloids, and suspensions.
3. Identify two colloids related to air and water pollution.
4. Distinguish between chemical and physical properties and changes.
5. State and explain the law of conservation of mass.

PA Standards/Anchors:

Eligible Content:

S11.C.1.1
S11.C.2.2

- S11.C.1.1.2,6
- S11.C.2.2.1

Instructional Strategies:

Assessments:

Coooperative groups
Problem solving activities
Lecture
Performance task
Written work
Hands-on activity
Note Taking
Charting

- Quizzes
- Tests
- Homework
- Lab work

Course Title: Physical Science

Topic/Concept: Ch. 10/12 - Atomic Structure, Elements and Properties

Time Allotment: 10 days

Unit Sequence: 9

Major Concepts to be learned:

1. Elements
2. Periodic Table of Elements
3. Atomic mass, mass number, and average atomic mass
4. Metals, Nonmetals, Metalloids
5. Element symbols

Expected Skills to be demonstrated:

1. List the names and symbols of common elements.
2. Describe and build a model of the atom, including arrangement of electrons.
3. Compute the atomic mass and mass number of an atom, understanding average atomic mass due to isotopes.
4. Describe the periodic table of elements and use it to find information about an element.
5. Compare and contrast metals, nonmetals, and metalloids.

PA Standards/Anchors:

Eligible Content:

S11.C.1.1	<ul style="list-style-type: none">• S11.C.1.1.1,2,4
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Instructional Strategies:

Assessments:

Problem solving activities Lecture Written work Hands-on activity Oral presentation Note Taking	<ul style="list-style-type: none">• Quizzes• Tests• Homework• Lab work
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Course Title: Physical Science

Topic/Concept: Ch. 11 - Chemical Bonds

Time Allotment: 15 days

Unit Sequence: 10

Major Concepts to be learned:

1. Chemical formulas
2. Chemical compounds
3. Types of bonds
4. Oxidation numbers
5. Compound dangers in the home

Expected Skills to be demonstrated:

1. Explain why atoms bond and what a chemical formula represents.
2. Describe and identify ionic bonds and polar and nonpolar covalent bonds.
3. Describe the dangers posed by hazardous compounds in the home.
4. Explain how to determine oxidation numbers.
5. Write formulas and name compounds.

PA Standards/Anchors:

Eligible Content:

S11.C.1.1

- S11.C.1.1.2,3

Instructional Strategies:

Assessments:

Problem solving activities
Lecture
Performance task
Written work
Hands-on activity
Note Taking
Graphic organizers
Charting

- Quizzes
- Tests
- Homework
- Lab work

Course Title: Physical Science

Topic/Concept: Ch. 13/14 - Organic Compounds and Useful Materials

Time Allotment: 10 days

Unit Sequence: 11

Major Concepts to be learned:

1. Organic compounds
2. Classification of compounds
3. Alternative energy sources
4. Polymers
5. Inorganic compounds

Expected Skills to be demonstrated:

1. Describe structures of organic compounds, distinguish between saturated and unsaturated hydrocarbons, and identify isomers.
2. Classify groups of organic compounds as aromatic or substituted hydrocarbons.
3. Describe the role of biomass and biogas in increasing our energy supply.
4. Describe polymers and their formation of biological compounds.
5. Identify and describe uses of alloys and plastics.

PA Standards/Anchors:

Eligible Content:

S11.C.1.1
S11.C.2.2

- S11.C.1.1.1-3
- S11.C.2.2.2

Instructional Strategies:

Assessments:

Problem solving activities
Lecture
Research
Written work
Hands-on activity
Note Taking

- Quizzes
- Tests
- Homework
- Lab work
- Research

Course Title: Physical Science

Topic/Concept: Ch. 15 - Solutions

Time Allotment: 13 days

Unit Sequence: 12

Major Concepts to be learned:

1. Solutes and Solvents
2. Factors affects rates of dissolving
3. Solubility
4. Types of solutions

Expected Skills to be demonstrated:

1. Classify solutions into three types and identify their solutes and solvents.
2. Describe the factors that affect the rates at which solids and gases dissolve in liquids.
3. Discuss how solubility varies among different solutes and for the same solute at different temperatures.
4. Compare and contrast a saturated, an unsaturated, and a supersaturated solution.

PA Standards/Anchors:

Eligible Content:

S11.C.1.1

- S11.C.1.1.1-3,6

Instructional Strategies:

Assessments:

Problem solving activities
Lecture
Performance task
Written work
Hands-on activity
Note Taking
Specific Reading

- Quizzes
- Tests
- Homework
- Lab work

Course Title: Physical Science

Topic/Concept: Ch. 16 - Chemical Reactions

Time Allotment: 12 days

Unit Sequence: 13

Major Concepts to be learned:

1. Chemical Reactions
2. Law of Conservation of Mass
3. Writing Balanced Chemical Equations
4. Four Types of Chemical Reactions

Expected Skills to be demonstrated:

1. Identify reactants and products in a chemical reaction.
2. Explain how a chemical reaction satisfies the law of conservation of mass.
3. Demonstrate how to write balanced chemical equations.
4. Describe four types of chemical reactions using their generalized formulas.

PA Standards/Anchors:

Eligible Content:

S11.C.1.1
S11.C.2.1

- S11.C.1.1.1,3
- S11.C.2.1.2,3

Instructional Strategies:

Assessments:

Problem solving activities
Lecture
Performance task
Written work
Hands-on activity
Note Taking
Charting

- Quizzes
- Tests
- Homework
- Lab work

Course Title: Physical Science

Topic/Concept: Ch. 17 - Acids, Bases, and Salts

Time Allotment: 12 days

Unit Sequence: 14

Major Concepts to be learned:

1. Acids and Bases
2. Ionization and Dissociation
3. Strength and Concentration of Acids and Bases
4. pH
5. Acid Rain

Expected Skills to be demonstrated:

1. Describe the characteristic properties of acids and bases and name some common ones.
2. Relate the processes of ionization and dissociation to the formation of acids and bases.
3. Differentiate between strength and concentration of acids and bases.
4. Describe the relationship between pH and the strength of an acid or a base.
5. Describe factors contributing to the formation of acid rain, discuss the effects, and evaluate methods of controlling this problem.

PA Standards/Anchors:

Eligible Content:

S11.C.1.1

- S11.C.1.1.3

Instructional Strategies:

Assessments:

Problem solving activities
Lecture
Group discussion
Written work
Hands-on activity
Note Taking
Charting

- Quizzes
- Tests
- Homework
- Lab work

Course Title: Physical Science

Topic/Concept: Ch. 18/19 - Waves, Sound, and Light

Time Allotment: 10 days

Unit Sequence: 15

Major Concepts to be learned:

1. Transverse Waves
2. Compression Waves
3. Frequency and Wavelength
4. Electromagnetic Waves and Electromagnetic Spectrum
5. Reflection, Refraction, and Diffraction

Expected Skills to be demonstrated:

1. Sketch a transverse wave and a compression wave and identify its characteristics.
2. Discuss relationships between frequency and wavelength in waves.
3. Contrast electromagnetic waves with other kinds of waves.
4. Describe the arrangement of electromagnetic waves on the electromagnetic spectrum.
5. Compare and contrast reflection, refraction, and diffraction.

PA Standards/Anchors:

Eligible Content:

S11.C.2.1	<ul style="list-style-type: none">• S11.C.2.1.1
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Instructional Strategies:

Assessments:

Coooperative groups Lecture Performance task Hands-on activity Graphic organizers	Problem solving activities Group discussion Written work Note Taking	<ul style="list-style-type: none">• Quizzes• Tests• Homework• Lab work
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Course Title: Physical Science

Topic/Concept: Ch. 21 - Electricity

Time Allotment: 10 days

Unit Sequence: 16

Major Concepts to be learned:

1. Static Electricity
2. Potential Difference, Resistance, and Current
3. Series and Parallel Circuit
4. Circuit Breakers and Fuses
5. Electrical Power

Expected Skills to be demonstrated:

1. Describe the effects of static electricity and recognize the presence of a charge in an electroscope.
2. Conceptually and mathematically relate potential difference, resistance, and current.
3. Sketch a series and a parallel circuit, and list applications of each type of circuit.
4. Recognize the function of circuit breakers and fuses.
5. Explain and calculate electrical power.

PA Standards/Anchors:

Eligible Content:

S11.C.2.1

- S11.C.2.1.1,4

Instructional Strategies:

Assessments:

Coooperative groups	Problem solving activities
Lecture	Performance task
Written work	Hands-on activity
Note Taking	Graphic organizers
Charting	Evaluating

- Quizzes
- Tests
- Lab work
- Homework