

Course Title: General Science

Topic/Concept: Space

Time Allotment: 3 Weeks

Unit Sequence: 1

Major Concepts to be learned:

1. The nature of the electromagnetic spectrum.
2. The importance of hydrostatic equilibrium to a star.
3. The applicability and implications of special and general relativity.
4. The significance of Hubble's Law.
5. The scale of the universe.

Expected Skills to be demonstrated:

1. Be able to place a star on the H-R diagram based on a verbal description of the star.
2. Be able to solve a Hubble's Law problem.

PA Standards/Anchors:

Eligible Content:

S11.D.3.1	<ul style="list-style-type: none">• S11.D.3.1.2• S11.D.3.1.3
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Instructional Strategies:

Assessments:

Lecture Note Taking	<ul style="list-style-type: none">• Test
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Course Title: General Science

Topic/Concept: Measurement and Matter

Time Allotment: 2 weeks

Unit Sequence: 2

Major Concepts to be learned:

1. Units of measurement.
2. The concept of density.
3. The classification of matter according to composition and by state.
4. The difference between physical and chemical properties.

Expected Skills to be demonstrated:

1. Select appropriate units of measurement.
2. Convert between units of measurement.
3. Calculate and measure density.

PA Standards/Anchors:

Eligible Content:

S11.A.2.2

- S11.A.2.2.1

Instructional Strategies:

Assessments:

Problem solving activities
Lecture
Hands-on activity
Note Taking

- Test
- Lab

Course Title: General Science

Topic/Concept: Atomic Structure/Radiation/Periodic Table

Time Allotment: 5 weeks

Unit Sequence: 3

Major Concepts to be learned:

1. Limitations of modeling an atom.
2. Electron configuration determines chemical properties.
3. Significance of periods and groups in periodic table.
4. Neutrons contribute to nuclear stability.
5. The difference between fission and fusion.

Expected Skills to be demonstrated:

1. Determine number of protons, neutrons, and electrons for a given isotope.
2. Solve simple half life problems.
3. Solve simple dosimetry problems.
4. Complete a nuclear reaction.
5. Compute the average atomic mass of an element.

PA Standards/Anchors:

Eligible Content:

S11.C.1.1	<ul style="list-style-type: none">• S11.C.1.1.1• S11.C.1.1.2• S11.C.1.1.4
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Instructional Strategies:

Assessments:

Problem solving activities Lecture Hands-on activity Note Taking	<ul style="list-style-type: none">• Test• Lab
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Course Title: General Science

Topic/Concept: Chemical Bonding and Reactions

Time Allotment: 4 weeks

Unit Sequence: 4

Major Concepts to be learned:

1. Valence electrons are responsible for chemical properties.
2. Difference between ionic and covalent bonding.
3. Difference between acids and bases.

Expected Skills to be demonstrated:

1. Name ionic and covalent compounds, including those containing polyatomic ions.
2. Name acids and bases.
3. Name straight-chain and branched alkanes.
4. Balance chemical equations.
5. Identify chemical reactions by type.

PA Standards/Anchors:

Eligible Content:

S11.C.1.1

- S11.C.1.1.3

Instructional Strategies:

Assessments:

Problem solving activities
Lecture
Hands-on activity
Note Taking

- Test
- Lab

Course Title: General Science

Topic/Concept: Solutions

Time Allotment: 4 weeks

Unit Sequence: 5

Major Concepts to be learned:

1. "Like dissolves like"
2. The concept of concentration.
3. The concept of polarity.

Expected Skills to be demonstrated:

1. Classify a chemical bond as covalent, polar covalent, or ionic based on percent ionic character.
2. Determine whether a molecule is polar or non-polar.
3. Calculate the concentration of a solution.

PA Standards/Anchors:

Eligible Content:

S11.C.1.1

- S11.C.1.1.3

Instructional Strategies:

Assessments:

Problem solving activities
Lecture
Hands-on activity
Note Taking

- Test
- Lab

Course Title: General Science

Topic/Concept: Motion

Time Allotment: 3 weeks

Unit Sequence: 6

Major Concepts to be learned:

1. Newton's Laws of Motion.
2. Vector v. scalar quantities.
3. Centripetal acceleration.
4. Freefall.
5. Projectile motion.

Expected Skills to be demonstrated:

1. Calculate velocity and acceleration given specific motion quantities or graphs.
2. Apply Newton's 2nd Law of Motion to solve problems.
3. Solve simple kinematics problems.

PA Standards/Anchors:

Eligible Content:

S11.C.3.1

- S11.C.3.1.2

Instructional Strategies:

Assessments:

Problem solving activities
Lecture
Hands-on activity
Note Taking

- Test
- Lab

Course Title: General Science

Topic/Concept: Work and Energy

Time Allotment: 2 weeks

Unit Sequence: 7

Major Concepts to be learned:

1. Mechanical advantage.
2. Work.
3. Energy.
4. Pressure.
5. Momentum.

Expected Skills to be demonstrated:

1. Calculate kinetic and gravitational potential energy.
2. Calculate the work done by a force.
3. Calculate ideal and actual mechanical advantage for a simple machine.
4. Calculate momentum.
5. Calculate pressure.

PA Standards/Anchors:

Eligible Content:

S11.C.3.1

- S11.C.3.1.1
- S11.C.3.1.2
- S11.C.3.1.5
- S11.C.3.1.6

Instructional Strategies:

Assessments:

Problem solving activities
Lecture
Hands-on activity
Note Taking

- Test
- Lab

Course Title: General Science

Topic/Concept: Energy project

Time Allotment: 4 weeks

Unit Sequence: 8

Major Concepts to be learned:

1. Causes and consequences of global warming
2. Sources and uses of energy in the world

Expected Skills to be demonstrated:

1. Explain the problems that arise from the use of fossil fuels.
2. Evaluate solutions to the fossil fuels problem.

PA Standards/Anchors:

Eligible Content:

S11.C.2.2

- S11.C.2.2.1
- S11.C.2.2.2
- S11.C.2.2.3

Instructional Strategies:

Assessments:

Research
Oral presentation

- PresentationTest

Course Title: General Science

Topic/Concept: Electricity

Time Allotment: 2 weeks

Unit Sequence: 9

Major Concepts to be learned:

1. Electric charge and force
2. Ohm's law
3. Magnetism
4. Electromagnetic waves

Expected Skills to be demonstrated:

1. Solve problems using Ohm's Law
2. Calculate electrical power
3. Use a multimeter
4. Read the resistance of a resistor using its color bands

PA Standards/Anchors:

Eligible Content:

S11.C.2.1
S11.C.2.3

- S11.C.2.1.1
- S11.C.2.1.4
- S11.C.3.1.4

Instructional Strategies:

Assessments:

Problem solving activities
Lecture
Hands-on activity
Note Taking

- Test
- Lab

Course Title: General Science

Topic/Concept: Sound

Time Allotment: 1 week

Unit Sequence: 10

Major Concepts to be learned:

1. Sound as a compressional wave

Expected Skills to be demonstrated:

1. Solve problems involving the speed, frequency, and wavelength of sound.
2. Calculate the frequency of a standing sound wave in a column of air in either an open or closed tube.
3. Calculate beat frequency.
4. Calculate the Doppler shift for a moving source or listener of sound.

PA Standards/Anchors:

Eligible Content:

N/A

N/A

Instructional Strategies:

Assessments:

Problem solving activities
Lecture
Hands-on activity
Note Taking

- Test
- Lab