

INTEGRATED PHYSICS AND CHEMISTRY (IPC): Grades 9-11

Ms. Sion Mitchell

August 2007 through May 2008

(PV) = Experiments Sponsored and Supported through the Partnership with
Prairie View A&M University (Drs. Saganti / Kumar / Cudnik)

Unit-1: Energy and Motion (~ 30 class periods or ~ 6 weeks)

Topics	TAKS Objectives
<i>Ch-1: Nature of Science</i>	<i>Objective-1:</i> The student will demonstrate an understanding of the nature of science
<i>Ch-2: Motion and Speed</i>	
<i>Ch-3: Forces</i>	<i>Objective-5:</i> The student will demonstrate an understanding of motion, forces, energy
<i>Ch-4: Energy</i>	
<i>Ch-5: Work and Machines</i>	
<i>Ch-6: Thermal Energy</i>	

Ch-1: Sub-Topics	Activities / Examples	Laboratory Exercises
1. Scientific Methods	1. Measurement	3. Counting Pennies Graphically
2. Measurement Standards	Conversions	
3. Computing and Communicating with Graphs	2. Error Estimations	

Ch-2: Sub-Topics	Activities / Examples	Laboratory Exercises
4. Describing Motion	4. Force and Acceleration	6. Motion of a bowling ball
5. Acceleration		
6. Motion and Forces	5. Comparing motion from different forces	7. Airplane Launcher (PV)
7. Newton's First Law		

Ch-3: Sub-Topics	Activities / Examples	Laboratory Exercises
8. Newton's Second Law	8. Measuring air resistance	10. Projectile Motion
9. Gravity as Force		11. Rocket Launcher (PV)
10. Newton's Third Law	9. Momentum of moving objects	12. Hover Craft (PV)
		13. Free Fall (PV)

Ch-4: Sub-Topics	Activities / Examples	Laboratory Exercises
11. The Nature of Energy	14. Bouncing Balls	16. Pendulum and Energy Description
12. Potential and Kinetic Energy	15. Swimming Activity	17. Roller Coasters (PV)
13. Conversion of Energy		

Ch-5: Sub-Topics	Activities / Examples	Laboratory Exercises
14. Work and Energy 15. Simple Machines	18. Levers (classes and examples) 19. Working - Smarter	20. Working with Pulleys (PV)

Ch-6: Sub-Topics	Activities / Examples	Laboratory Exercises
16. Temperature and Heat 17. Transferring Thermal Energy	21. Illustrations of Conduction, Convection, and Radiation of heat transfer	22. Specific Heats of Metals 23. Thermal Energy from Foods 24. Bimetallic strips (PV) 25. Expts. with liquid nitrogen (PV) 26. Expts. with Dry Ice

Teaching Emphasis -

Force and Motion

1. Unbalanced forces cause changes in motion.
2. Friction affects an object's motion.
3. For every action there is an equal and opposite reaction.

Work

4. Work is affected by changes in distance or force.

Energy

5. Machines make work easier to varying levels of efficiency.

Lesson 1: Calculating Force and Motion Synopsis: Students will investigate and manipulate formulas for speed, momentum, acceleration, work, and power

Lesson 2: Applications of Newton's Laws Synopsis: Investigate and describe applications of Newton's Laws

Lesson 3: Changing Force and Distance Synopsis: Analyze the effects caused by changing force or distance in simple machines

Lesson 4: Mechanical Advantage and Efficiency Synopsis: Investigate and demonstrate mechanical advantage and efficiency of various machines

Unit-2: Electricity and Energy Resources (~ 30 class periods or ~ 6 weeks)

Topics	TAKS Objectives
Ch-7: Electricity Ch-8: Magnetism and its Uses Ch-9: Radioactivity and Nuclear Reactions Ch-10: Energy Sources	Objective-4: The student will demonstrate an understanding of the structure and properties of matter Objective-5: The student will demonstrate an understanding of motion, forces, energy

Ch-7: Sub-Topics	Activities / Examples	Laboratory Exercises
1. Electrical Charge 2. Electrical Current 3. Electrical Energy	<ul style="list-style-type: none"> • Conductors and insulators • Series and parallel circuits 	<ul style="list-style-type: none"> • Wet Cell Batteries • Simple Circuits

Ch-8: Sub-Topics	Activities / Examples	Laboratory Exercises
4. Electricity and Magnetism 5. Electromagnetic conduction	<ul style="list-style-type: none"> • Electricity and Magnetism • Electromagnets • Magnetic trains 	<ul style="list-style-type: none"> • Electro Magnetic Coil (PV) • Magnetic lavation (PV)

Ch-9: Sub-Topics	Activities / Examples	Laboratory Exercises
6. Radioactivity 7. Nuclear Decay 8. Detecting Radioactivity 9. Nuclear Reactions	<ul style="list-style-type: none"> • Chain reactions • Discovery of x-rays • Discovery of radioactivity 	<ul style="list-style-type: none"> • Experiments with smoke detectors (PV)

Ch-10: Sub-Topics	Activities / Examples	Laboratory Exercises
10. Fossil Fuels 11. Nuclear Energy 12. Renewable Energy	<ul style="list-style-type: none"> • Solar Cells • Cost of Energy 	<ul style="list-style-type: none"> • Solar Cells and Energy (PV) • Wind Energy (PV)

Teaching Emphasis

- 1) Conservation of Energy
- 2) Transfer of mechanical energy to heat energy

Lesson 1: Law of Conservation of Energy

Lesson 2: Transfer of Heat

Lesson 3: Nuclear Fission - Nuclear fission is the process of splitting an atom resulting in new byproducts being produced and the release of large amounts of energy.

Lesson 4: Nuclear Fusion - Nuclear fusion is the process of combining atoms resulting in new byproducts being produced and the release of large amounts of energy.

Unit-3: Energy on the Move (~ 30 class periods or ~ 6 weeks)

Topics	TAKS Objectives
<i>Ch-11: Waves</i>	Objective-4: The student will demonstrate an understanding of the structure and properties of matter
<i>Ch-12: Sound</i>	
<i>Ch-13: Electromagnetic Waves</i>	Objective-5: The student will demonstrate an understanding of motion, forces, energy
<i>Ch-14: Light</i>	
<i>Ch-15: Mirrors and Lenses</i>	

Teaching Emphasis

- 1) Waves have specific characteristics, which can be modeled and measured.
- 2) Waves have many interactions and uses in every day life.
- 3) Waves contribute to the application of acoustic principles.

Lesson 1: Characteristics of Waves

Lesson 2: Interactions of Waves

Lesson 3: Applications of Acoustic Waves

Unit-4: Nature and Properties of Matter (~ 30 class periods or ~ 6 weeks)

Topics	TAKS Objectives
<i>Ch-16: Solids, Liquids, and Gases</i>	Objective-4: The student will demonstrate an understanding of the structure and properties of matter
<i>Ch-17: Classification of Matter</i>	
<i>Ch-18: Properties of Atoms and Periodic Table</i>	
<i>Ch-19: Chemical Bonding</i>	

Teaching Emphasis

- 1) Physical Change Physical change occurs when an object undergoes a change that does not affect its chemical nature.
- 2) Chemical Change - A chemical change produces a new substance with different chemical properties than the original.
- 3) The development of the atomic theory comes and the contributions of several scientists.
- 4) Matter from everyday life can be classified as elements, compounds, or mixtures.
- 5) The chemical behavior of an element including bonding, relates to its placement on the periodic table.
- 6) Fluids have properties including density, viscosity, and buoyancy.
- 7) Constituents of various materials or objects can be identified using spectral analysis techniques.

Lesson 1: Discovery of the Atom

Lesson 2: Classifying Matter

Lesson 3: Spectral Analysis

Lesson 4: Bonding
Lesson 5: Determining Density

Unit-5: Diversity of Matter (~ 30 class periods or ~ 6 weeks)

Topics	TAKS Objectives
Ch-20: Elements and their Properties	Objective-4: The student will demonstrate an understanding of the structure and properties of matter
Ch-21: Organic Compounds	
Ch-22: New Materials through Chemistry	

Unit-6: Interactions of Matter (~ 30 class periods or ~ 6 weeks)

Topics	TAKS Objectives
Ch-23: Solutions	Objective-4: The student will demonstrate an understanding of the structure and properties of matter
Ch-24: Chemical Reactions	
Ch-25: Acids, Bases, and Salts	

Teaching Emphasis

- 1) Conservation of Mass In a chemical reaction, the mass of the products equals the mass of the reactants.
- 2) Activation of Energy - All chemical reactions require a certain minimum amount of energy to be present in order for a reaction to begin.
- 3) Endergonic Reaction - Some reactions absorb energy from the environment as they proceed.
- 4) Exergonic Reaction - Some reactions release energy in to the environment as they proceed.
- 5) Solution Chemistry Water is considered the universal solvent because of its structure
- 6) Different factors affect solubility rates
- 7) The concentration of ions in a solution affects its behavior
- 8) Acid rain has negative effects

Lesson 1: Physical vs. Chemical Change
Lesson 2: Endergonic and Exergonic Energy
Lesson 3: Conservation of Mass
Lesson 4: Nuclear Reactions
Lesson 5: End Products
Lesson 6: Structure of Water
Lesson 7: Solubility and Influential Factors
Lesson 8: Ion Concentrations
Lesson 9: Effects of Acid Rain

IPC - Teaching Plan: Ms. Mitchell (2007-2008)

School Sessions	Dates (2007-08)	Week	Unit
1st Six Weeks			
Aug 27 - Oct 5	27-Aug-07	Week-01	Unit-1
29 Days	3-Sep-07	Week-02	Unit-1
	10-Sep-07	Week-03	Unit-1
	17-Sep-07	Week-04	Unit-1
	24-Sep-07	Week-05	Unit-1
	1-Oct-07	Week-06	Unit-1
2nd Six Weeks			
Oct 9 - Nov 9	8-Oct-07	Week-07	Unit-2
24 Days	15-Oct-07	Week-08	Unit-2
	22-Oct-07	Week-09	Unit-2
	29-Oct-07	Week-10	Unit-2
	5-Nov-07	Week-11	Unit-2
3rd Six Weeks			
Nov 12 - Dec 21	12-Nov-07	Week-12	Unit-3
27 Days	19-Nov-07	Week-13	Unit-3
	26-Nov-07	Week-14	Unit-3
	3-Dec-07	Week-15	Unit-3
	10-Dec-07	Week-16	Unit-3
	17-Dec-07	Week-17	Unit-3
Holidays	24-Dec-07	Week-18	Holidays
Holidays	31-Dec-07	Week-19	Holidays
4th Six Weeks			
Jan 7 - Feb 15	7-Jan-08	Week-20	Unit-4
29 Days	14-Jan-08	Week-21	Unit-4
	21-Jan-08	Week-22	Unit-4
	28-Jan-08	Week-23	Unit-4
	4-Feb-08	Week-24	Unit-4
	11-Feb-08	Week-25	Unit-4
5th Six Weeks			
Feb 18 - Apr 11	18-Feb-08	Week-26	Unit-5
35 Days	25-Feb-08	Week-27	Unit-5
	3-Mar-08	Week-28	Unit-5
	10-Mar-08	Week-29	Unit-5
	17-Mar-08	Week-30	Unit-5
	24-Mar-08	Week-31	Unit-5
	31-Mar-08	Week-32	Unit-5
	7-Apr-08	Week-33	Unit-5
6th Six Weeks			
Apr 14 - May 29	14-Apr-08	Week-34	Unit-6
33 Days	21-Apr-08	Week-35	Unit-6
	28-Apr-08	Week-36	Unit-6
	5-May-08	Week-37	Unit-6
	12-May-08	Week-38	Unit-6
	19-May-08	Week-39	Unit-6
	26-May-08	Week-40	Unit-6