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| **SUGGESTED PACING** |
| **STRAND: PHYSICAL SCIENCE (PS)** **Topic:** **Conservation of Mass and Energy** This topic focuses on the empirical evidence for the arrangements of atoms on the Periodic Table of Elements, conservation of mass and energy, transformation and transfer of energy. **Content Statements:*** The properties of matter are determined by the arrangement of atoms.
* Elements can be organized into families with similar properties, such as highly reactive metals, less-reactive metals, highly reactive nonmetals and some gases that are almost completely nonreactive.
* Substances are classified according to their properties, such as metals and acids.
* When substances interact to form new substances, the properties of the new substances may be very different from those of the old, but the amount of mass does not change.

**Content Statements:*** Energy can be transformed or transferred but is never lost.
* When energy is transferred from one system to another, the quantity of energy before transfer equals the quantity of energy after transfer. When energy is transformed from one form to another, the total amount of energy remains the same.

**Content Statements:*** Energy can be transferred through a variety of ways. Mechanical energy can be transferred when objects push or pull on each other over a distance.
* Electromagnetic waves transfer energy when they interact with matter.
* Thermal energy can be transferred through radiation, convection and conduction.
* Electrical energy transfers when an electrical source is connected in a complete electrical circuit to an electrical device.
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| **PRINT RESOURCES** | **DIGITAL RESOURCES** |
| *ScienceFusion** Unit 7, TE pages 535-658
* Unit 7, Lab Manual pages 480-574
* Unit 7, Assessment Guide pages 197-235
* Unit 8, TE pages 659-767
* Unit 8, Lab Manual pages 575-669
* Unit 8, Assessment Guide pages 236-273
 | *ScienceFusion** Unit 7, Lesson 1 Digital Lesson
* Unit 7, Lesson 2 Digital Lesson
* Unit 7, Lesson 3 Digital Lesson
* Unit 7, Lesson 3 Virtual Lab
* Unit 7, Lesson 4 Digital Lesson
* Unit 7, Lesson 4 Virtual Lab
* Unit 7, Lesson 5 Digital Lesson
* Unit 7, Lesson 6 Digital Lesson
* Unit 7, Lesson 7 Digital Lesson
* Unit 7, Lesson 7 Virtual Lab
 | * Unit 8, Lesson 1 Digital Lesson
* Unit 8, Lesson 1 Virtual Lab
* Unit 8, Lesson 2 Digital Lesson
* Unit 8, Lesson 3 Digital Lesson
* Unit 8, Lesson 3 Virtual Lab
* Unit 8, Lesson 4 Digital Lesson
* Unit 8, Lesson 4 Virtual Lab
* Unit 8, Lesson 5 Digital Lesson
* Unit 8, Lesson 6 Digital Lesson
* Unit 8, Lesson 6 Virtual Lab
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| **SCIENCE AND ACADEMIC VOCABULARY** |
| Acid, Amplitude, Atom, Atomic Number, Average Atomic Mass, Base, Calorie, Chemical Change, Chemical Equation, Chemical Formula, Chemical Reaction, Chemical Symbol, Concentration, Conduction, Conductor, Convection, Electric Circuit, Electric Current, Electromagnetic Wave, Electron, Electron Cloud, Endothermic Reaction, Energy, Energy Transmission, Exothermic Reaction, Force, Frequency, Group, Heat, Insulator, Kinetic Energy, Law Of Conservation Of Energy, Law Of Conservation Of Mass, Longitudinal Wave, Mass Number, Mechanical Energy, Mechanical Wave, Medium, Metal, Metalloid, Mixture, Neutralization Reaction, Neutron, Nonmetal, Nucleus, Parallel Circuit, Period, Periodic Table, pH, Physical Change, Potential Energy, Product, Proton, Radiation, Reactant, Resistance, Salt, Series Circuit, Solubility, Solute, Solution, Solvent, Thermal Energy, Transverse Wave, Voltage, Wave Period, Wave Speed, Wavelength, Work |
| **DIFFERENTIATION** | **FIELD EXPERIENCE CONNECTIONS** |
| Leveled Inquiry* Unit 7 TE pages 540, 554, 568, 582, 596, 612, 626, 642
* Unit 8 TE pages 664, 676, 690, 702, 720, 738, 752

Response to Intervention* Unit 7 TE page 541
* Unit 8 TE page 665

Differentiated Instruction (Basic, ELL, and Advanced)* Unit 7 TE pages 557, 571, 585, 599, 608, 615, 629, 645
* Unit 8 TE pages 679, 693, 705, 717, 723, 734, 741, 748, 755
 | Great Lakes Science Center’s Cleveland Creates! Program. ***Program Details:*** A standards-based program that uses the Engineering and Design Process. Students learn about energy transformation and electricity through an electrifying demonstration and a hands-on workshop. To prepare in advance, plan to attend the professional development session. For more information contact: Karyn Saunders 216-696-2760 or email saundersk@glsc.org |
| **INQUIRY SKILLS** |
| * Analyzing Results
* Answering Questions
* Applying Concepts
* Calculating Results
* Collecting Data
* Comparing Models
* Comparing Observations
 | * Creating Models
* Creating/Constructing Graphs
* Developing Hypotheses
* Developing Procedures
* Drawing Conclusions
* Evaluating Procedures
 | * Explaining Events
* Explaining Observations
* Identifying Patterns
* Interpreting Data
* Interpreting Observations
* Making Inferences
 | * Making Observations
* Making Predictions
* Organizing Results
* Planning Investigations
* Practicing Lab Techniques
* Writing Chemical Equations
 |
| **HANDS-ON INQUIRY AND APPLICATION** |
| Unit 7* Lesson 1 Quick Lab 1: Physical or Chemical Change?: LM pages 480-482
* Lesson 1 Quick Lab 2: Properties of Combined Substances: LM pages 483-486
* Lesson 2 Quick Lab 1: Investigate the Size of Atomic Particles: LM pages 487-490
* Lesson 2 Quick Lab 2: Investigate Masses of Atomic Particles: LM pages 491-494
* Lesson 3 Quick Lab 1: A Model Atom: LM pages 495-497
* Lesson 3 Quick Lab 2: Predicting Properties: LM pages 498-501
* Lesson 3 Quick Lab 3: Recognizing Patterns: LM pages 502-504
* Lesson 4 Quick Lab 1: Breaking Bonds in a Chemical Reaction: LM pages 505-507
* Lesson 4 Quick Lab 2: Catalysts and Chemical Reactions: LM pages 508-511
* Lesson 4 Exploration Lab 1: Change of Pace: LM pages 512-525
* Lesson 5 Quick Lab 1: Investigate Solutions: LM pages 526-529
* Lesson 5 Quick Lab 2: Solution Concentration: LM pages 530-533
* Lesson 5 Exploration Lab 1: Investigate Solubility: LM pages 534-544
* Lesson 6 Quick Lab 1: Household Acids and Bases: LM pages 545-547
* Lesson 6 Quick Lab 2: Making Salt: LM pages 548-551
* Lesson 6 Exploration Lab 1: Acids, Bases, and Fruit Oxidation: LM pages 552-562
* Lesson 7 Quick Lab 1: Determining pH Levels: LM pages 563-566
* Lesson 7 Quick Lab 2: Investigating Respiration with Chemical Indicators: LM pages 567-570
* Lesson 7 Quick Lab 3: Investigating the Effects of Acid Precipitation: LM pages 571-574
 | * Unit 8
* Lesson 1 Quick Lab 1: Electrical, Light, and Heat Energy: LM pages 575-578
* Lesson 1 Quick Lab 2: Conservation of Energy: LM pages 579-582
* Lesson 2 Quick Lab 1: Transferring Potential Energy: LM pages 583-586
* Lesson 2 Quick Lab 2: The Energy of a Pendulum: LM pages 587-590
* Lesson 2 S.T.E.M. Lab 1: Energy in a Roller Coaster: LM pages 591-599
* Lesson 3 Quick Lab 1: Simple Heat Engine: LM pages 600-603
* Lesson 3 Quick Lab 2: Observing the Transfer of Energy: LM pages 604-607
* Lesson 3 Quick Lab 3: Exploring Thermal Conductivity: LM pages 608-610
* Lesson 3 Field Lab 1: Building a Solar Cooker: LM pages 611-623
* Lesson 4 Quick Lab 1: Resonance in a Bottle: LM pages 624-626
* Lesson 4 Quick Lab 2: Waves: LM pages 627-630
* Lesson 4 Quick Lab 3: Waves on a Spring: LM pages 631-633
* Lesson 5 Quick Lab 1: Investigate Electric Current: LM pages 634-638
* Lesson 5 Quick Lab 2: Lemon Battery: LM pages 639-642
* Lesson 5 S.T.E.M. Lab 1: Voltage, Current, and Resistance: LM pages 643-653
* Lesson 6 Quick Lab 1: Compare Parallel and Series Circuits: LM pages 654-657
* Lesson 6 Quick Lab 2: Compare Materials for Use in Fuses: LM pages 658-661
* Lesson 6 Exploration Lab 1: Model the Electric Circuits in a Room: LM pages 662-669
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| **ASSESSMENTS/PROGRESS MONITORING** |
| * Formative and Summative Assessment
	+ Unit 7, Lesson 1 - TE page 559
	+ Unit 7, Lesson 2 - TE page 573
	+ Unit 7, Lesson 3 - TE page 587
	+ Unit 7, Lesson 4 - TE page 601
	+ Unit 7, Lesson 5 - TE page 617
	+ Unit 7, Lesson 6 - TE page 631
	+ Unit 7, Lesson 7 - TE page 647
	+ Unit 8, Lesson 1 - TE page 681
	+ Unit 8, Lesson 2 - TE page 695
	+ Unit 8, Lesson 3 - TE page 707
	+ Unit 8, Lesson 4 - TE page 725
	+ Unit 8, Lesson 5 - TE page 743
	+ Unit 8, Lesson 6 - TE page 757
 | * Visual Summary and Lesson Review
	+ Unit 7, Lesson 1 - TE page 565
	+ Unit 7, Lesson 2 - TE page 579
	+ Unit 7, Lesson 3 - TE page 593
	+ Unit 7, Lesson 4 - TE page 607
	+ Unit 7, Lesson 5 - TE page 622
	+ Unit 7, Lesson 6 - TE page 638
	+ Unit 7, Lesson 7 - TE page 653
	+ Unit 8, Lesson 1 - TE page 687
	+ Unit 8, Lesson 2 - TE page 699
	+ Unit 8, Lesson 3 - TE page 713
	+ Unit 8, Lesson 4 - TE page 732
	+ Unit 8, Lesson 5 - TE page 747
	+ Unit 8, Lesson 6 - TE page 763
 | * Unit 7 Review - TE page 654-657
* Unit 8 Review - TE page 764-767
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| **ASSESSMENT GUIDE** |
| Unit 7* Unit 7 Pretest: AG pages 197-198
* Lesson 1 Quiz: Physical and Chemical Changes: AG page 199
* Lesson 1 Alternative Assessment: Physical and Chemical Changes: AG page 200
* Lesson 2 Quiz: The Atom: AG page 201
* Lesson 2 Alternative Assessment: The Atom: AG page 202
* Lesson 3 Quiz: The Periodic Table: AG page 203
* Lesson 3 Alternative Assessment: The Periodic Table: AG page 204
* Lesson 4 Quiz: Chemical Reactions: AG page 205
* Lesson 4 Alternative Assessment: Chemical Reactions: AG page 206
* Lesson 5 Quiz: Solutions: AG page 207
* Lesson 5 Alternative Assessment: Solutions: AG page 208
* Lesson 6 Quiz: Acids, Bases, and Salts: AG page 209
* Lesson 6 Alternative Assessment: Acids, Bases, and Salts: AG page 210
* Lesson 7 Quiz: Measuring pH: AG page 211
* Lesson 7 Alternative Assessment: Measuring pH: AG page 212
* Performance-Based Assessment: Teacher Edition: AG page 213
* Performance-Based Assessment: Student Edition: AG pages 214-215
* Unit 7 Unit Review: AG pages 216-221
* Unit 7 Unit Test A: AG pages 222-228
* Unit 7 Unit Test B: AG pages 229-235
 | Unit 8* Unit 8 Pretest: AG pages 236-237
* Lesson 1 Quiz: Energy Transformation and Transfer: AG page 238
* Lesson 1 Alternative Assessment: Energy Transformation and Transfer: AG page 239
* Lesson 2 Quiz: Mechanical Energy: AG page 240
* Lesson 2 Alternative Assessment: Mechanical Energy: AG page 241
* Lesson 3 Quiz: Thermal Energy and Heat: AG page 242
* Lesson 3 Alternative Assessment: Thermal Energy and Heat: AG page 243
* Lesson 4 Quiz: Waves and Energy: AG page 244
* Lesson 4 Alternative Assessment: Waves and Energy: AG page 245
* Lesson 5 Quiz: Electric Currents: AG page 246
* Lesson 5 Alternative Assessment: Electric Currents: AG page 247
* Lesson 6 Quiz: Electric Circuits: AG page 248
* Lesson 6 Alternative Assessment: Electric Circuits: AG page 249
* Performance-Based Assessment: Teacher Edition: AG page 250
* Performance-Based Assessment: Student Edition: AG pages 251-252
* Unit 8 Unit Review: AG pages 253-258
* Unit 8 Unit Test A: AG pages 259-265
* Unit 8 Unit Test B: AG pages 266-273
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| **ACADEMIC CONNECTIONS TO OTHER DISCIPLINES:**  |
| * Life Science Connection: TE page 558
* Technology Connection: TE page 558
* Earth Science Connection: TE page 572
* Technology Connection: TE page 572
* Astronomy Connection: TE page 586
* Biology Connection: TE page 596
* Art Connection: TE page 600
* Life Science Connection: TE page 600
* Do the Math: TE page 604
* Math Connection: TE page 616
* Social Studies Connection: TE page 616
* Language Arts Connection: TE page 616
* Do the Math: TE page 621
* Fine Arts Connection: TE page 630
* Real World Connection: TE page 630
* Fine Arts Connection: TE page 646
 | * Real World Connection: TE page 646
* Do the Math: TE page 649
* Real World Connection: TE page 680
* Fine Arts Connection: TE page 680
* Physical Education Connection: TE page 694
* Fine Arts Connection: TE page 694
* Do the Math: TE page 698
* Real World Connection: TE page 706
* Social Studies Connection: TE page 706
* Real World Connection: TE page 724
* Earth Science Connection: TE page 724
* Do the Math: TE page 731
* Social Studies Connection: TE page 742
* Environmental Science Connection: TE page 742
* History Connection: TE page 756
* Health Connection: TE page 756
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