

## Pacing Guide for 7-12 Curriculum

Course Title: Physical Science

Length of Course: 36 Weeks

Week Number	Chapter & Lesson	COS	Objectives SWBAT.....	Strategies/Materials Needed
<i>Week 1</i>	Orientation Lab Safety Lab Equipment	AHSG E 1	1. Select appropriate laboratory glassware, balances, time measuring equipment, and optical instruments to conduct an experiment. <ul style="list-style-type: none"> <li>• Select appropriate glassware for conducting experiments including a graduated cylinder, a beaker, a flask, a test tube, a microscope slide, a pipette, and a Petri dish</li> <li>• Select appropriate measuring equipment for conducting experiments including a balance and a stopwatch.</li> </ul>	Laboratory Equipment Identification Lab Worksheet with pictures of various pieces of lab equipment Beaker, flask, test tube, microscope slide, pipette, Petri dish, graduated cylinder, Triple beam balance, goggles, test tube holder, test tube rack, thermometers
Week 2	Chapter 1: Introduction to Science	COS 12	12. Identify metric units for mass, distance, time, temperature, velocity, acceleration, density, force, energy, and power. Use metric prefixes, metric units, scientific notation, conversion factors, scientific method. Draw and interpret line graphs, bar graphs and pie charts.	Metric Measurement Lab I Metric Rulers, graduated cylinders, triple beam balances, various miscellaneous items to measure for length, mass, volume,
Week 3	Chapter 1: Introduction to Science	COS 12	12. Identify metric units for mass, distance, time, temperature, velocity, acceleration, density, force, energy, and power. Use metric prefixes, metric units, scientific notation, conversion factors, scientific method. Draw and interpret line graphs, bar graphs and pie charts.	Metric Measurement Lab II Ruler, graduated cylinder, triple beam balance, various miscellaneous items to measure for length, mass, volume, <b>density</b>
Week 4	Chapter 1: Introduction to Science	COS 12	12. Identify metric units for mass, distance, time, temperature, velocity, acceleration, density, force, energy, and power. Use metric prefixes, metric units, scientific notation, conversion factors, scientific method. Draw and interpret line graphs, bar graphs and pie charts.	Round Things Lab Graph Paper, PVC Circular Rings, Metric Tape Measures
Week 5	Chapter 2: Matter	COS 5 COS 12	5. Describe physical and chemical changes in terms of endothermic and exothermic processes. 12. Identify metric units for mass, distance, time, temperature, velocity, acceleration, density, force, energy, and power.	Endothermic/Exothermic Lab Citric Acid, Baking soda, Calcium chloride, Quart Size Ziplock Bags, Snack Size Ziplock Bags, Triple Beam Balance, Graduated cylinder
Week 6	Chapter 2: Matter	COS 5 COS 12	5. Describe physical and chemical changes in terms of endothermic and exothermic processes. 12. Identify metric units for mass, distance, time, temperature, velocity, acceleration, density, force, energy, and power.	Separation of Mixtures Lab Distilled water, clear plastic cups, filter paper, filter funnel, magnets, paper towels, plastic spoons, mixture made of salt, sand, iron fillings, and seeds

Week 7	Chapter 4: Atoms and the Periodic Table	COS 1	1. Recognize periodic trends of elements, including the number of valence electrons, atomic size, and reactivity. <ul style="list-style-type: none"> <li>• Categorize elements as metals, nonmetals, metalloids, and noble gases</li> <li>• Differentiate between families and periods</li> <li>• Use atomic number and mass number to identify isotopes</li> </ul>	Periodic Table Activity Blank Periodic Table, Markers,
Week 8	Chapter 4: Atoms and the Periodic Table	COS 1	1. Recognize periodic trends of elements, including the number of valence electrons, atomic size, and reactivity. <ul style="list-style-type: none"> <li>• Categorize elements as metals, nonmetals, metalloids, and noble gases</li> <li>• Differentiate between families and periods</li> <li>• Use atomic number and mass number to identify isotopes</li> </ul>	Periodic Table Projects Poster Board, Markers,
Week 9	Chapter 5: The Structure of Matter	COS 3 COS 4	3. Contrast the formation of ionic and covalent bonds based on the transfer or sharing of valence electrons. <ul style="list-style-type: none"> <li>• Demonstrate the formation of positive and negative monatomic ions by using electron dot diagrams</li> </ul> 4. Use nomenclature and chemical formulas to write balanced chemical equations.	Electron Dot Diagram Activity Worksheet Lewis Structure Activity Worksheet
Week 10	Chapter 5: The Structure of Matter	COS 3 COS 4	3. Contrast the formation of ionic and covalent bonds based on the transfer or sharing of valence electrons. <ul style="list-style-type: none"> <li>• Demonstrate the formation of positive and negative monatomic ions by using electron dot diagrams</li> </ul> 4. Use nomenclature and chemical formulas to write balanced chemical equations.	Ionic Compound Models Activity Models for building ionic compounds
Week 11	Chapter 6: Chemical Reactions	COS 4	4. Use nomenclature and chemical formulas to write balanced chemical equations. <ul style="list-style-type: none"> <li>• Explain the law of conservation of matter</li> <li>• Identify chemical reactions as composition, decomposition, single replacement, or double replacement</li> <li>• Define the role of electrons in chemical reactions</li> </ul>	Ionic Compound Activity Instructions and Paper Ions
Week 12	Chapter 6: Chemical Reactions	COS 4	4. Use nomenclature and chemical formulas to write balanced chemical equations. <ul style="list-style-type: none"> <li>• Explain the law of conservation of matter</li> <li>• Identify chemical reactions as composition, decomposition, single replacement, or double replacement</li> </ul> Define the role of electrons in chemical reactions	Making Ice Cream Activity Milk, sugar, vanilla, ziplock bags, salt

Week 13	Chapter 7: Solutions	COS 2	2. Identify solutions in terms of components, solubility, concentration, and conductivity. <ul style="list-style-type: none"> <li>• Compare saturated, unsaturated, and supersaturated solutions</li> <li>• Compare characteristics of electrolytes and nonelectrolytes</li> <li>• Describe factors that affect solubility and rate of solution, including nature of solute and solvent, temperature, agitation, surface area, and pressure on gases</li> </ul>	Solubility Lab Hot plates, salt, sugar, beakers, stirrers, thermometers, graph paper
Week 14	Chapter 7: Solutions	COS 2	2. Identify solutions in terms of components, solubility, concentration, and conductivity. <ul style="list-style-type: none"> <li>• Compare saturated, unsaturated, and supersaturated solutions</li> <li>• Compare characteristics of electrolytes and nonelectrolytes</li> <li>• Describe factors that affect solubility and rate of solution, including nature of solute and solvent, temperature, agitation, surface area, and pressure on gases</li> </ul>	Conductivity Lab Conductivity testers, salt, sugar, citric acid, baking soda,
Week 15	Chapter 8: Acids, Bases and Salts	COS 2	2. Identify solutions in terms of components, solubility, concentration, and conductivity. <ul style="list-style-type: none"> <li>• Compare saturated, unsaturated, and supersaturated solutions</li> <li>• Compare characteristics of electrolytes and nonelectrolytes</li> <li>• Describe factors that affect solubility and rate of solution, including nature of solute and solvent, temperature, agitation, surface area, and pressure on gases</li> </ul>	Chromatography Lab Filter paper, Various types of blue or black Ball point pens,
Week 16	Chapter 9: Nuclear Changes	COS 11	11. Describe the nuclear composition of unstable isotopes and the resulting changes to their nuclear composition. <ul style="list-style-type: none"> <li>• Identify types of nuclear emissions, including alpha particles, beta particles, and gamma radiation</li> <li>• Distinguish between fission and fusion</li> <li>• Identify uses and possible negative side effects of nuclear technology</li> </ul>	M and M Half-life activity For each group: M and M's, graph paper, plastic cups
Week 17	Chapter 9: Nuclear Changes	COS 11	11. Describe the nuclear composition of unstable isotopes and the resulting changes to their nuclear composition. <ul style="list-style-type: none"> <li>• Identify types of nuclear emissions, including alpha particles, beta particles, and gamma radiation</li> <li>• Differentiate between fission and fusion</li> <li>• Identify uses and possible negative side effects of nuclear technology</li> </ul>	Nuclear Reaction Equation Activity Paper isotopes

Week 18	Mid Term Review and Test on Chapters 1-9		See Above	
Week 19	Chapter 10: Motion	COS 7 COS 12	<p>7. Relate velocity, acceleration, and kinetic energy to mass, distance, force, and time.</p> <ul style="list-style-type: none"> <li>• Interpret graphic representations of velocity versus time and distance versus time</li> <li>• Solve problems for velocity, acceleration,</li> <li>• Describe action and reaction forces, inertia, acceleration, momentum, and friction in terms of Newton's three laws of motion</li> <li>• Determine the resultant of collinear forces acting on a body</li> </ul> <p>12. Identify metric units for mass, distance, time, temperature, velocity, acceleration, density, force, energy, and power.</p>	<p>Walk It Off Activity</p> <p>For each group: Walk it Off Graphs</p>
Week 20	Chapter 10: Motion	COS 7 COS 12	<p>7. Relate velocity, acceleration, and kinetic energy to mass, distance, force, and time.</p> <ul style="list-style-type: none"> <li>• Interpret graphic representations of velocity versus time and distance versus time</li> <li>• Solve problems for velocity, acceleration,</li> <li>• Describe action and reaction forces, inertia, acceleration, momentum, and friction in terms of Newton's three laws of motion</li> <li>• Determine the resultant of collinear forces acting on a body</li> </ul> <p>12. Identify metric units for mass, distance, time, temperature, velocity, acceleration, density, force, energy, and power.</p>	<p>Comparing Motion from Different Forces Lab</p> <p>For each group: Small toy cars, inclined planes, stopwatch, metersticks, graph paper</p>
Week 21	Chapter 10: Motion	COS 7 COS 12	<p>7. Relate velocity, acceleration, and kinetic energy to mass, distance, force, and time.</p> <ul style="list-style-type: none"> <li>• Interpret graphic representations of velocity versus time and distance versus time</li> <li>• Solve problems for velocity, acceleration,</li> <li>• Describe action and reaction forces, inertia, acceleration, momentum, and friction in terms of Newton's three laws of motion</li> <li>• Determine the resultant of collinear forces acting on a body</li> </ul> <p>12. Identify metric units for mass, distance, time, temperature, velocity, acceleration, density, force, energy, and power.</p>	<p>Hover Craft Activity</p> <p>For each group: Balloons, cardboard circles, soda bottle caps, ice pick</p>

Week 22	Chapter 11: Forces	COS 6 COS 7	6. Identify characteristics of gravitational, electromagnetic, and nuclear forces. 7. Relate velocity, acceleration, and kinetic energy to mass, distance, force, and time. <ul style="list-style-type: none"> <li>• Interpret graphic representations of velocity versus time and distance versus time</li> <li>• Solve problems for velocity, acceleration, force, work, and power</li> <li>• Describe action and reaction forces, inertia, acceleration, momentum, and friction in terms of Newton's three laws of motion</li> <li>• Determine the resultant of collinear forces acting on a body</li> <li>• Solve problems for efficiency and mechanical <b>advantage of simple machines</b></li> </ul>	Momentum of Colliding objects Lab Meterstick, softballs, racquet balls, tennis balls, baseballs, stopwatches, masking tape, triple beam balance
Week 23	Chapter 11: Forces	COS 6 COS 7	6. Identify characteristics of gravitational, electromagnetic, and nuclear forces. 7. Relate velocity, acceleration, and kinetic energy to mass, distance, force, and time. <ul style="list-style-type: none"> <li>• Interpret graphic representations of velocity versus time and distance versus time</li> <li>• Solve problems for velocity, acceleration, force, work, and power</li> <li>• Describe action and reaction forces, inertia, acceleration, momentum, and friction in terms of Newton's three laws of motion</li> <li>• Determine the resultant of collinear forces acting on a body</li> <li>• Solve problems for efficiency and mechanical <b>advantage of simple machines</b></li> </ul>	Pendulum Lab For each group: Ring stand, test tube clamp, medium rubber stopper, string, metersticks, graph paper
Week 24	Chapter 12: Work and Energy	COS 7 COS 8 COS 12	7. Relate velocity, acceleration, and kinetic energy to mass, distance, force, and time. <ul style="list-style-type: none"> <li>• Interpret graphic representations of velocity versus time and distance versus time</li> <li>• Solve problems for velocity, acceleration, force, work, and power</li> <li>• Describe action and reaction forces, inertia, acceleration, momentum, and friction in terms of Newton's three laws of motion</li> <li>• Determine the resultant of collinear forces acting on a body</li> <li>• Solve problems for efficiency and mechanical advantage of simple machines</li> </ul> 8. Relate the law of conservation of energy to transformations of potential energy, kinetic energy, and thermal energy. <ul style="list-style-type: none"> <li>• Relate simple formulas to the calculation of potential energy, kinetic energy, and work</li> </ul> 12. Identify metric units for mass, distance, time, temperature, velocity, acceleration, density, force, energy, and power.	Lever Lab For each group: Stiff cardboard, quarters, dimes, nickels, triple beam balance, metric ruler

Week 25	Chapter 12: Work and Energy	COS 7 COS 8 COS 12	<p>7. Relate velocity, acceleration, and kinetic energy to mass, distance, force, and time.</p> <ul style="list-style-type: none"> <li>• Interpret graphic representations of velocity versus time and distance versus time</li> <li>• Solve problems for velocity, acceleration, force, work, and power</li> <li>• Describe action and reaction forces, inertia, acceleration, momentum, and friction in terms of Newton's three laws of motion</li> <li>• Determine the resultant of collinear forces acting on a body</li> <li>• Solve problems for efficiency and mechanical advantage of simple machines</li> </ul> <p>8. Relate the law of conservation of energy to transformations of potential energy, kinetic energy, and thermal energy.</p> <ul style="list-style-type: none"> <li>• Relate simple formulas to the calculation of potential energy, kinetic energy, and work</li> </ul> <p>12. Identify metric units for mass, distance, time, temperature, velocity, acceleration, density, force, energy, and power.</p>	Computer lab on simple machines
Week 26	Chapter 12: Work and Energy	COS 7 COS 8	<p>7. Relate velocity, acceleration, and kinetic energy to mass, distance, force, and time.</p> <ul style="list-style-type: none"> <li>• Interpret graphic representations of velocity versus time and distance versus time</li> <li>• Solve problems for velocity, acceleration, force, work, and power</li> <li>• Describe action and reaction forces, inertia, acceleration, momentum, and friction in terms of Newton's three laws of motion</li> <li>• Determine the resultant of collinear forces acting on a body</li> <li>• Solve problems for efficiency and mechanical advantage of simple machines</li> </ul> <p>8. Relate the law of conservation of energy to transformations of potential energy, kinetic energy, and thermal energy.</p> <ul style="list-style-type: none"> <li>• Relate simple formulas to the calculation of potential energy, kinetic energy, and work</li> </ul> <p>12. Identify metric units for mass, distance, time, temperature, velocity, acceleration, density, force, energy, and power.</p>	Lab Determining the Energy of a Rolling Ball For each group: Triple beam balance, 3 ft long board, box, golf ball, racquet ball or other small ball, masking tape, meterstick, stopwatch
Week 27	Chapter 13: Heat and Temperature	COS 8 COS 12	<p>8. Relate the law of conservation of energy to transformations of potential energy, kinetic energy, and thermal energy.</p> <ul style="list-style-type: none"> <li>• Identify the relationship between thermal energy and the temperature of a sample of matter</li> <li>• Describe the flow of thermal energy between two samples of matter</li> <li>• Explain how thermal energy is transferred by radiation, conduction, and convection</li> </ul> <p>12. Identify metric units for mass, distance, time, temperature, velocity, acceleration, density, force, energy, and power.</p>	Transfer of Energy Lab For each group: beaker, tongs, thermometer, stopwatch, electric hot plate, graduated cylinder, 40 identical small metal washers, 40 cm string

Week 28	Chapter 13: Heat and Temperature	COS 8 COS 12	<p>8. Relate the law of conservation of energy to transformations of potential energy, kinetic energy, and thermal energy.</p> <ul style="list-style-type: none"> <li>Identify the relationship between thermal energy and the temperature of a sample of matter</li> <li>Describe the flow of thermal energy between two samples of matter</li> <li>Explain how thermal energy is transferred by radiation, conduction, and convection</li> </ul> <p>12. Identify metric units for mass, distance, time, temperature, velocity, acceleration, density, force, energy, and power.</p>	<p>Convection Lab:</p> <p>For each group: One clear "Tupperware" type tub, the size of a shoe box, two 1000mL beakers, tongs, hot plate, 1 pound of ice, three 400 ml beakers for Styrofoam cups, blue food coloring</p>
Week 29	Chapter 14: Waves	COS 9	<p>9. Compare methods of energy transfer by mechanical and electromagnetic waves.</p> <ul style="list-style-type: none"> <li>Distinguish between transverse and longitudinal mechanical waves</li> <li>Relate physical properties of sound and light to wave characteristics</li> </ul>	<p>Waves in Different Mediums Lab</p> <p>Metal and Plastic Slinkys, light and heavy rope, string, rubber bands, strips of heavy cloth, strips of light cloth, stopwatch</p>
Week 30	Chapter 14: Waves	COS 9	<p>9. Compare methods of energy transfer by mechanical and electromagnetic waves.</p> <ul style="list-style-type: none"> <li>Distinguish between transverse and longitudinal mechanical waves</li> <li>Relate physical properties of sound and light to wave characteristics</li> </ul>	<p>Angle of Reflection Activity</p> <p>For each group: Graph paper, marble,</p>
Week 31	Chapter 15: Sound and Light	COS 9	<p>9. Compare methods of energy transfer by mechanical and electromagnetic waves.</p> <ul style="list-style-type: none"> <li>Distinguish between transverse and longitudinal mechanical waves</li> <li>Relate physical properties of sound and light to wave characteristics</li> </ul>	<p>Making Music lab</p> <p>Test tubes, test tube rack,</p>
Week 32	Chapter 15: Sound and Light	COS 9	<p>9. Compare methods of energy transfer by mechanical and electromagnetic waves.</p> <ul style="list-style-type: none"> <li>Distinguish between transverse and longitudinal mechanical waves</li> <li>Relate physical properties of sound and light to wave characteristics</li> </ul>	<p>Measuring refraction activity</p> <p>For each group: 3 beakers, water, vinegar, vegetable oil, 3 straws, protractor</p>
Week 33	Chapter 16: Electricity	COS 10	<p>10. Explain the relationship between electricity and magnetism.</p> <ul style="list-style-type: none"> <li>Differentiate between induction and conduction</li> <li>Identify mechanical, magnetic, and chemical methods used to create an electrical charge</li> <li>Describe electrical circuits in terms of Ohm's law</li> </ul>	<p>Electroscope Activity</p> <p>Erlenmeyer flasks, Copper wire, aluminum foil strips, plastic, glass, and acrylic rods, silk and wool samples</p>
Week 34	Chapter 16: Electricity	COS 10	<p>10. Explain the relationship between electricity and magnetism.</p> <ul style="list-style-type: none"> <li>Differentiate between induction and conduction</li> <li>Identify mechanical, magnetic, and chemical methods used to create an electrical charge</li> <li>Describe electrical circuits in terms of Ohm's law</li> </ul>	<p>Identifying Conductors and Insulators Lab</p> <p>Batteries, flashlight bulbs, bulb holder, insulated wire, assortment of items to test for conductivity</p>

Week 35	Chapter 17: Magnetism	COS 10	10. Explain the relationship between electricity and magnetism. <ul style="list-style-type: none"> <li>• Differentiate between induction and conduction</li> <li>• Identify mechanical, magnetic, and chemical methods used to create an electrical charge</li> <li>• Describe electrical circuits in terms of Ohm's law</li> </ul>	Circuit Lab Batteries, battery holders, lamps, lamp holders, insulated wire, alligator clips, circuit switches, wire cutters
Week 36:	Final exam review and test		See above objectives	