

Cartersville Middle School Curriculum Map

Grade Level/Subject Area: HS Physical Science

	Unit 1: Chemistry (8 weeks)	Unit 2: States of Matter/ Gas Laws (2 weeks)	Unit 3: Solutions, Solubility, Acids and Bases (2 weeks)
Essential Standard(s)	<p>SPS1: Obtain, evaluate, and communicate information from the Periodic Table to explain the relative properties of elements based on patterns of atomic structure.</p> <p>SPS2: Obtain, evaluate, and communicate information to explain how atoms bond to form stable compounds.</p> <p>SPS3: Obtain, evaluate, and communicate information to support the Law of Conservation of Matter.</p> <p>*Matter and Energy are conserved within a closed system (chemical energy, bonds, & atoms).</p>	<p>SPS5. Obtain, evaluate, and communicate information to compare and contrast the phases of matter as they relate to atomic and molecular motion</p>	<p>SPS6. Obtain, evaluate, and communicate information to explain the properties of solutions.</p> <p>a. Develop and use models to explain the properties of solutions.</p> <p>b. Plan and carry out investigations to determine how temperature, surface area, and agitation affect the rate solutes dissolve in a specific solvent</p> <p>d. Obtain and communicate information to explain the relationship between the structure and properties of acids and bases.</p>
Learning Targets for Essential	<p>I can understand that all matter is made up of atoms, and all molecules</p>	<p>I can compare and contrast pure substances (elements and compounds) and mixtures.</p>	<p>· Students will be able to determine the properties of a solution and be</p>

<p>Standard(s) with estimated teaching time</p>	<p>are made up of subatomic particles</p> <p>I can identify the subatomic particles of an atom and where they are located within the atom</p> <p>I can identify the charge of protons, neutrons, and electrons</p> <p>I can identify key groups in the periodic table and explain how the groups are organized</p> <p>I can determine the number of protons, electrons, and neutrons of an element using the periodic table</p> <p>I can create a Bohr model for any given element on the periodic table</p>	<p>I can explain the movement of particles in solids, liquids, gases, and plasma states when thermal energy is added or removed.</p> <p>Students will be able to identify phases of matter based off particle arrangement and molecular motion.</p> <p>Students will be able to compare the amount of energy present in different states of matter according to molecular motion.</p> <p>Students will be able to identify phase changes based on molecular motion.</p> <p>Students will be able to differentiate and explain the difference between chemical and physical properties/changes</p> <p>Students will be able to conceptually explain gas laws in a closed system.</p>	<p>able to analyze and interpret a solubility curve.</p> <p>a) Identify solute, solvent, homogeneous, and heterogeneous solution.</p> <p>Students will be able to explain the relationship between structure and properties of acids/bases and be able to classify common household substances as an acid, base, or neutral.</p> <p>a) Explain what an acid and a base are.</p> <p>b) Identify based on pH and Litmus paper color changes</p>
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<p>Supporting Elements</p>	<ul style="list-style-type: none"> • SPS1.a Develop and use models to compare and contrast the structure of atoms, ions and isotopes. • SPS1.b Analyze and interpret data to determine trends of the following: <ul style="list-style-type: none"> ○ Number of valence electrons ○ Types of ions formed by main group elements ○ Location and properties of metals, nonmetals, and metalloids ○ Phases at room temperature • SPS2.a Analyze and interpret data to predict properties of ionic and covalent compounds. • SPS2.b Develop and 	<p>a. Ask questions to compare and contrast models depicting the particle arrangement and motion in solids, liquids, gases, and plasmas.</p> <p>b. Plan and carry out investigations to identify the relationships among temperature, pressure, volume, and density of gases in closed systems. (Clarification statement: Using specific Gas laws to perform calculations is beyond the scope of this standard; emphasis should focus on the conceptual understanding of the behavior of gases rather than calculations.)</p>	<p>c. Analyze and interpret data from a solubility curve to determine the effect of temperature on solubility.</p>
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	<p>use models to predict formulas for stable, binary ionic compounds based on balance of charges.</p> <ul style="list-style-type: none"> • SPS2.c Use the International Union of Pure and Applied Chemistry (IUPAC) nomenclature for translating between chemical names and chemical formulas. • SPS3.a Plan and carry out investigations to generate evidence supporting the claim that mass is conserved during a chemical reaction. • SPS3.b Develop and use a model of a chemical equation to illustrate how the total number of atoms is conserved during a chemical reaction. 		
<p>Learning Targets for Supporting</p>	<p>I can explain atomic mass, atomic number, symbols, and know the difference between ions and isotopes</p>		<p>Read a solubility curve to predict mass or temperature.</p>

<p>Standards with estimated teaching time</p>	<p>I can predict the number of valence electrons and ions formed (cations/anions by main groups) based upon the electron configuration.</p> <p>I can identify properties of metals, nonmetals, and metalloids based off of location on the periodic table.</p> <p>I can construct Bohr Models and Lewis Dot Diagrams for elements of main groups.</p> <p>I can develop models by analyzing patterns within the periodic table.</p> <p>I can identify, predict, and name formulas for stable binary ionic compounds.</p> <ul style="list-style-type: none"> a) Ionic bond is between metal and nonmetal. b) Criss crossing method to predict stable formula. c) Use IUPAC rules for nomenclature. <p>I can identify, predict, and name formulas for stable covalent compounds.</p>	<p>Students will be able to calculate and compare specific heat for different substances.</p> <p>Students will be able to explain and conduct calculations for Charles' Law, Boyle's Law, Gay-Lussac's Law, and Ideal Gas Law.</p>	<p>Determine if solution is unsaturated, saturated, or supersaturated based on solubility curve.</p>
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	<p>d) Covalent is between two nonmetals.</p> <p>e) Use IUPAC rules for nomenclature.</p>		
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	Unit 4: Energy (3-4 weeks)	Unit 5: Motion, Force, Simple Machines (6-7 weeks)	Unit 6: Electricity and Magnetism (4-5 weeks)
Essential Standard(s)	<p>SPS4 Obtain, evaluate, and communicate information to explain the changes in nuclear structure as a result of fission, fusion and radioactive decay.</p> <p>SPS7.a Construct explanations for energy transformations within a system.</p>	<p>SPS7. Obtain, evaluate, and communicate information to explain transformations and flow of energy within a system.</p> <p>SPS8. Obtain, evaluate, and communicate information to explain the relationships among force, mass, and motion.</p>	<p>SPS10. Obtain, evaluate, and communicate information to explain the properties of and relationships between electricity and magnetism.</p>
Learning Targets for Essential Standard(s) with estimated teaching time	<ul style="list-style-type: none"> I can identify changes in the nuclear structure as it pertains to fission, fusion, and radioactive decay. I can construct arguments about benefits and issues with nuclear energy. 	<p>Students will be able to identify speed, velocity, and acceleration using graphs and data (values on x and y-axis).</p> <p>a) Define speed, velocity, and acceleration.</p>	<p>Students will be able to explain the three types of fields that exist between objects.</p> <ul style="list-style-type: none"> Define gravity, electricity, and magnetism. Explain real-world examples/applications.

		<p>b) Identify the dependent and independent variables for each graph (speed and acceleration).</p> <p>c) Differentiate between position vs. time and velocity vs. time graphs.</p> <p>d) Students will be able to determine the type of motion occurring based on information from graphs.</p> <ul style="list-style-type: none"> · Students will be able to describe balanced and unbalanced forces based on Newton's Laws of Motion. <p>a) Define balanced and unbalanced forces.</p> <p>b) Describe the effects of a balanced force acting on an object.</p> <p>c) Describe the effects of an unbalanced force acting on an object.</p> <p>d) Use free body diagrams to explain the effects of balanced and unbalanced.</p> <ul style="list-style-type: none"> · Students can explain Newton's Laws. <p>a) Define Newton's 3 Laws of Motion.</p> <p>b) Apply Newton's 3 Laws to real-world situations</p>	<p>Students will be able to explain the three methods of inducing an electromagnetic charge and their applications.</p> <ul style="list-style-type: none"> • Define electromagnetism. • Define conduction, induction, and friction. • Define conductor and insulator. Explain real-world applications of electromagnetic induction.
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<p>Supporting Standards</p>	<p>SPS4.a Develop a model that illustrates how the nucleus changes as a result of fission and fusion.</p> <p>SPS4.b Use mathematics and computational thinking to explain the process of half-life as it relates to radioactive decay.</p> <p>SPS4.c Construct arguments based on evidence about the applications, benefits, and problems of nuclear energy as an alternative energy source.</p>	<p>d. Use mathematics and computational thinking to identify the relationships between work, mechanical advantage, and simple machines.</p>	<p>SPS10</p> <p>a. Use mathematical and computational thinking to support a claim regarding relationships among voltage, current, and resistance. Science</p> <p>b. Develop and use models to illustrate and explain the conventional flow (direct and alternating) of current and the flow of electrons in simple series and parallel circuits. (Clarification statement: Advantages and disadvantages of series and parallel circuits should be addressed.)</p> <p>c. Plan and carry out investigations to determine the relationship between magnetism and the movement of electrical charge. (Clarification statement: Investigations could include electromagnets, simple motors, and generators.)</p>

<p>Learning Targets for Supporting Standards with estimated teaching time</p>	<p>I can identify the difference between fission and fusion based on scientific models.</p> <p>I can conceptually and mathematically explain half-life.</p> <p>I can discuss pros and cons of nuclear energy.</p>	<p>Students will be able to explain the relationships between work, mechanical advantage, and simple machines.</p> <p>Students will be able to compare and contrast the uses of different simple machines.</p>	<ul style="list-style-type: none"> · Students will be able to apply Ohm’s Law to specific electrical situations. <ul style="list-style-type: none"> a) Identify and define the components of Ohm’s Law b) Perform calculations using conceptual models. · Students will be able to explain the flow of electrons in a series and parallel circuits. <ul style="list-style-type: none"> a) Define series and parallel circuits. b) Identify and differentiate between series and parallel circuits. c) Define direct and alternating current. d) Identify advantages and disadvantages of the use of series and parallel circuits. · Students will be able to explain electromagnetism and how it applies to simple motors and generators. <ul style="list-style-type: none"> a) Define electromagnetism, motors, and generators. b) Explain ways to increase the strength of electromagnets (coils, current, and nails).
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			c) Explain how an electric motor and generator work.
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	Unit 7 Properties of Waves/EM Spectrum (3-4 weeks)	Unit 8: Sound (2 weeks)
Essential Standard	SPS9 Obtain, evaluate, and communicate information to explain the properties of waves.	<p>SPS9. Obtain, evaluate, and communicate information to explain the properties of waves</p> <p>SPS9a. Analyze and interpret data to identify the relationships among wavelength, frequency, and energy in electromagnetic waves and amplitude and energy in mechanical waves.</p> <p>SPS9d Analyze and interpret data to explain how different media affect the speed of sound and light waves.</p> <p>SPS9e. Develop and use models to explain the changes in sound waves associated with the Doppler Effect.</p>
Learning Targets for Essential Standard(s) with estimated teaching time	<p>I can identify the basic components and properties of all waves.</p> <p>I can identify parts of compressional (wavelength, compression, rarefaction) and transverse waves (crest, trough, wavelength, amplitude).</p> <p>I can define and identify wavelength, frequency, and amplitude.</p>	<p>Students will be able to identify the basic components and properties of all waves.</p> <ul style="list-style-type: none"> Identify parts of compressional (wavelength, compression, rarefaction) Define and identify wavelength, frequency, and amplitude. <p>I can explain how changes in media and temperature impact the speed of sound and light waves.</p> <p>Students will be able to explain the Doppler Effect.</p>

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<p>Supporting Standards</p>	<p>SPS9.a Analyze and interpret data to identify the relationships among wavelength, frequency, and energy in electromagnetic waves and amplitude and energy in mechanical waves.</p> <p>SPS9.b Ask questions to compare and contrast the characteristics of electromagnetic and mechanical waves.</p> <p>SPS9.c Develop models based on experimental evidence that illustrate the phenomena of reflection, refraction, interference, and diffraction.</p> <p>SPS9.d Analyze and interpret data to explain how different media affect the speed of sound and light waves.</p>	<p>SPS9b. Ask questions to compare and contrast the characteristics of electromagnetic and mechanical waves.</p>
<p>Learning Targets for Supporting Standards with estimated teaching time</p>	<p>I can calculate wave speed and frequency.</p> <p>I can explain the interactions of waves based upon experimental evidence (reflection, refraction, interference, and diffraction).</p> <p>I can define and conceptually identify reflection, refraction, interference, and diffraction</p> <p>I can identify and differentiate between constructive and destructive interference.</p> <p>a) Apply to conceptual situations.</p>	<p>I can identify parts of compressional (wavelength, compression, rarefaction) and transverse waves (crest, trough, wavelength, amplitude).</p>

	<p>b) Explain how changes in media and temperature impact the speed of sound and light waves.</p>	
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