

Cartersville Middle School Curriculum Map

Grade Level/Subject Area: 8th Grade Science

	Unit 1: Chemistry (8 weeks)	Unit 2: States of Matter and Properties of Matter (3 weeks)	Unit 2: Transformations of Energy (3 weeks)
Essential Standard(s)	<p>S8P1: Obtain, evaluate, and communicate information about the structure and properties of matter.</p> <p>*Matter and Energy are conserved within a closed system (chemical energy, bonds, & atoms).</p>	<p>S8P1. Obtain, evaluate, and communicate information about the structure and properties of matter.</p>	<p>S8P2 Obtain, evaluate, and communicate information about the law of conservation of energy to develop arguments that energy can transform from one form to another within a system.</p> <p>*Energy is transferred or transformed within a system (mechanical energy, kinetic energy, and potential energy).</p>
Learning Targets for Essential Standard(s) with estimated teaching time	<p>I can understand that all matter is made up of atoms, and all molecules 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>Students will be able to identify the phases of matter based upon molecular motion and changes in phases and motion based upon the addition and subtraction of thermal energy.</p> <p>Students will be able to define and identify properties of solids, liquids, gases, and plasmas.</p> <p>Students will be able to conceptually identify solids, liquids, gases, and plasmas based on particle movement.</p> <p>Students will be able to compare and contrast particle movement of solids, liquids, gases, and plasmas.</p>	<p>Students will be able to analyze and interpret data to illustrate the relationship between kinetic and potential energy.</p> <p>a) Define kinetic and potential energy.</p> <p>b) Analyze graphs to determine potential and kinetic energy.</p> <p>c) Analyze graphs to determine the relationship between potential and kinetic energy.</p> <p>· Students will be able to explain the transformation of energy as it pertains to the Law of Conservation of Energy within a system.</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>Students will be able to conceptually identify changes in thermal energy using a phase change diagram.</p> <p>Students will be able to compare and contrast chemical and physical properties of matter and be able to identify chemical and physical changes.</p>	<p>a) Define the Law of Conservation of Energy.</p> <p>b) Identify kinetic and potential energy of a pendulum.</p> <p>c) Define the different types of energy.</p> <p>d) Be able to identify transformations of energy within a system.</p> <p>· Students will be able identify and explain the different types of heat transfer.</p> <p>a) Define conduction, convection, and radiation.</p> <p>b) Compare and contrast conduction, convection, and radiation.</p> <p>c) Conceptually identify conduction, convection, and radiation using models and real-world examples.</p>
<p>Supporting Elements</p>	<p>a. Develop and use a model to compare and contrast pure substances (elements and compounds) and mixtures.</p> <p>e. Develop models (e.g., atomic-level models, including drawings, and computer representations) by analyzing patterns within the periodic table</p>	<p>b. Develop and use models to describe the movement of particles in solids, liquids, gases, and plasma states when thermal energy is added or removed.</p> <p>c. Plan and carry out investigations to compare and contrast chemical (i.e., reactivity, combustibility) and physical (i.e., density, melting point, boiling point) properties of matter.</p>	<p>a. Analyze and interpret data to create graphical displays that illustrate the relationships of kinetic energy to mass and speed, and potential energy to mass and height of an object.</p> <p>b. Plan and carry out an investigation to explain the transformation between kinetic and potential energy within a system (e.g., roller coasters, pendulums, rubber bands, etc.).</p> <p>c. Construct an argument to support a claim about the type of energy</p>

	<p>that illustrate the structure, composition, and characteristics of atoms (protons, neutrons, and electrons) and simple molecules.</p> <p>f. Construct an explanation based on evidence to describe conservation of matter in a chemical reaction including the resulting differences between products and reactants.</p>	<p>d. Construct an argument based on observational evidence to support the claim that when a change in a substance occurs, it can be classified as either chemical or physical. (Clarification statement: Evidence could include ability to separate mixtures, development of a gas, formation of a precipitate, change in energy, color, and/or form.)</p>	<p>transformations within a system [e.g., lighting a match (light to heat), turning on a light (electrical to light)].</p> <p>d. Plan and carry out investigations on the effects of heat transfer on molecular motion as it relates to the collision of atoms (conduction), through space (radiation), or in currents in a liquid or a gas (convection).</p>
<p>Learning Targets for Supporting Standards with estimated teaching time</p>	<p>I can develop models by analyzing patterns within the periodic table.</p> <p>I can explain the conservation of matter in a chemical reaction including the resulting differences between products and reactants.</p>	<p>Students will be able to conceptually compare and contrast chemical and physical changes.</p> <p>Students will be able to define chemical and physical properties.</p> <p>Students will be able to identify chemical and physical properties.</p> <p>Students will be able to conceptually compare and contrast chemical and physical properties.</p> <p>Students will be able to define chemical and physical changes.</p>	<p>I can explain the relationships of kinetic energy to mass and speed, and potential energy to mass and height of an object.</p> <ol style="list-style-type: none"> I can explain the relationship between potential and kinetic Energy. I can explain the 7 forms of energy, including: mechanical, chemical, electrical, sound, light, nuclear, and heat. I can explain conduction, convection, and radiation as it relates to the collision of atoms

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	Unit 3: Motion (3-4 weeks)	Unit 4: Force (2 –3 weeks)	Unit 5: Electricity and Magnetism (3 weeks)
Essential Standard(s)	S8P3a. Analyze and interpret data to identify patterns in the relationships between speed and distance, and velocity and acceleration.	S8P3b. Construct an explanation using Newton’s Laws of Motion to describe the effects of balanced and unbalanced forces on the motion of an object. S8P3c. Construct an argument from evidence to support the claim that the amount of force needed to accelerate an object is proportional to its mass (inertia).	S8P5. Obtain, evaluate, and communicate information about gravity, electricity, and magnetism as major forces acting in nature. S8P5a. Construct an argument using evidence to support the claim that fields exist between objects exerting forces on each other even when the objects are not in contact.
Learning Targets for Essential Standard(s) with estimated teaching time	Students will be able to explain the difference between distance and displacement Students will be able to describe the characteristics of a motion graph. Students will be able to interpret and analyze distance vs. time graphs to explain the motion of an object. <ul style="list-style-type: none"> • Student can identify constant speed 	Students will be able to describe balanced and unbalanced forces based on Newton’s Laws of Motion. <ul style="list-style-type: none"> • Define balanced and unbalanced forces. • Describe the effects of a balanced force acting on an object. • Describe the effects of an unbalanced force acting on an object. 	Students will be able to explain the three types of fields that exist between objects. <ul style="list-style-type: none"> • Define gravity, electricity, and magnetism. • Explain real-world examples/applications. Students will be able to explain the three methods of inducing an

	<ul style="list-style-type: none"> • Student can identify speed at rest/no speed • Student can identify acceleration <p>I can interpret and analyze velocity vs. time graphs to explain the motion of an object.</p> <ul style="list-style-type: none"> • Student can identify constant speed • Student can identify speed at rest/no speed • Student can identify acceleration 	<ul style="list-style-type: none"> • Use free body diagrams to explain the effects of balanced and unbalanced. <p>Students can explain Newton's Laws.</p> <ul style="list-style-type: none"> • Define Newton's 3 Laws of Motion. • Apply Newton's 3 Laws to real-world situations. <p>2-3 weeks</p>	<p>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.
Supporting Standards			<p>S8P5b. Plan and carry out investigations to demonstrate the distribution of charge in conductors and insulators.</p> <p>S8P5c. Plan and carry out investigations to identify the factors that affect the strength of electric and magnetic forces.</p>
Learning Targets for Supportin			<p>Students will be able to describe factors that have an impact on the strength of electric and magnetic forces.</p> <ul style="list-style-type: none"> • Define generator, motor, and electromagnet. • Describe the factors the impact the strength of an electromagnet.

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	Unit 6a: Properties of Waves/EM Spectrum (3 weeks)	Unit 6b: Light Waves (3 weeks)	Unit 6c: Sound Waves (3 weeks)
Essential Standard	S8P4. Obtain, evaluate, and communicate information to support the claim that electromagnetic (light) waves behave differently than mechanical (sound) waves	S8P4. Obtain, evaluate, and communicate information to support the claim that electromagnetic (light) waves behave differently than mechanical (sound) waves	S8P4. Obtain, evaluate, and communicate information to support the claim that electromagnetic (light) waves behave differently than mechanical (sound) waves.

<p>Learning Targets for Essential Standard(s) with estimated teaching time</p>	<ul style="list-style-type: none"> • I can identify the location of <i>Crests, Troughs, and Resting Points</i> on a wave. • I can describe a Wave based on its <i>Amplitude, Wavelength, and Frequency</i>. • I can describe how the <i>primary colors</i> of light add to make <i>secondary colors</i> of light. 	<ul style="list-style-type: none"> • I can explain reflection, refraction, and diffraction of light waves. • I can explain and demonstrate how concave and convex mirrors and lenses affect the images we see. • I can explain the structure and function of the eye • I can analyze and interpret data to explain how different media affect the speed of sound and light waves. • I can explain the Angle of Incident/Reflection. 	<ul style="list-style-type: none"> • I can explain how sound waves are affected by changes in amplitude and pitch. • I can explain how the vibration of sound waves allows us to hear. • I can explain the relationships between pitch, wavelength, and amplitude. • I can explain how the vibration of sound waves allows us to hear.
<p>Supporting Standards</p>	<p>a. Ask questions to develop explanations about the similarities and differences between electromagnetic and mechanical waves</p> <p>b. Construct an explanation using data to illustrate the relationship between the electromagnetic spectrum and energy</p> <p>c. Design a device to illustrate practical applications of the electromagnetic spectrum (e.g., communication, medical, military).</p>	<p>d. Develop and use a model to compare and contrast how light and sound waves are reflected, refracted, absorbed, diffracted or transmitted through various materials.</p> <p>g. Develop and use models to demonstrate the effects that lenses have on light (i.e., formation an image) and their possible technological applications.</p>	<p>d. Develop and use a model to compare how light and sound waves are reflected, refracted, absorbed, diffracted or transmitted through various materials. (Clarification statement: Include echo and how color is seen but do not cover interference and scattering.)</p>

	<p>e. Analyze and interpret data to predict patterns in the relationship between density of media and wave behavior (i.e., speed).</p> <p>f. Develop and use a model (e.g., simulations, graphs, illustrations) to predict and describe the relationships between wave properties (e.g., frequency, amplitude, and wavelength) and energy.</p>		
<p>Learning Targets for Supporting Standards with estimated teaching time</p>	<ul style="list-style-type: none"> • I can explain the relationship between the electromagnetic spectrum and energy. • I can recall the relative Wavelengths and Frequencies of Electromagnetic Radiation for all Electromagnetic Waves. 	<ul style="list-style-type: none"> • I can draw the <i>Angle of Reflection</i> when given the <i>Angle of Incidence</i> (and vice versa!) Identify and Label a mirror as either Plane/Flat, Convex or Concave. • I can connect applications to Concave and Convex Mirrors. • I can describe how light rays interact with Plan/Flat, Convex and Concave Mirrors. • I can describe how light both <i>Bends/Refracts</i> and <i>Speeds Up/Down</i> when traveling from one medium to another. • I can describe how light rays interact with Convex and Concave Lens 	<ul style="list-style-type: none"> • I can describe how <i>sound and light</i> waves travel through mediums such as solids, liquids and gases.

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