Cartersville Middle School Curriculum Map **Grade Level/Subject Area:** 8th Grade Science

	Unit 1: Nature of Matter (6 weeks)	Unit 2: Transformations of Energy (6 weeks)	Unit 3: Nature of Sound and EM Radiation (6 weeks)	Unit 4: Contact Forces (6 weeks)
Essential Standard(s)	**S8P1: Obtain, evaluate, and communicate information about the structure and properties of matter.** *Matter and Energy are conserved within a closed system (chemical energy, bonds, & atoms).	**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.** *Energy is transferred or transformed within a system (mechanical energy, kinetic energy, and potential energy).	**S8P4. Obtain, evaluate, and communicate information to support the claim that electromagnetic (light) waves behave differently than mechanical (sound) waves.** *Mechanical and electromagnetic waves have different properties and behaviors based upon their medium.	**S8P3. Obtain, evaluate, and communicate information about cause and effect relationships between force, mass, and the motion of objects.** *Force, mass, and motion of objects relate to the speed, velocity, and acceleration of moving objects.
Learning Targets for Essential Standard(s) with estimated teaching time	I can explain how matter and energy are conserved within a system.	I can analyze and interpret how energy is transferred between objects and transformed within a system.	I can differentiate between the properties and behaviors of mechanical and electromagnetic waves. I can explain properties, behaviors, and application of electromagnetic waves. I can explain properties, behaviors, and application of mechanical waves.	I can relate speed, mass and velocity to the motion of objects. □ determine the relationship between velocity and acceleration in that acceleration is a rate of change in velocity □ demonstrate the effect of balanced and unbalanced forces on an object in terms of gravity, inertia, and friction recognize that every object exerts gravitational force on every other object □ recognize that the forces exerted by objects depend on how much mass the objects have and how far apart they are
Supporting Elements	**a.** Develop and use a model to compare and contrast pure substances (elements and compounds) and	**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	**a.** Ask questions to develop explanations about the similarities and differences between electromagnetic and mechanical waves.	**a.** Analyze and interpret data to identify patterns in the relationships between speed and distance, and velocity and acceleration.

	mixtures. **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. **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. **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. **e.** Develop models (e.g., atomic-level models, including drawings, and computer representations) by analyzing patterns within the periodic table that illustrate the structure, composition, and characteristics of atoms (protons, neutrons, and electrons) and simple molecules. **f.** Construct an explanation based on evidence to describe conservation of matter in a chemical reaction including the resulting differences between	height of an object. **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.). **c.** Construct an argument to support a claim about the type of energy transformations within a system [e.g., lighting a match (light to heat), turning on a light (electrical to light)]. **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).	(Clarification statement: Include transverse and longitudinal waves and wave parts such as crest, trough, compressions, and rarefactions.) **b.** Construct an explanation using data to illustrate the relationship between the electromagnetic spectrum and energy. **c.** Design a device to illustrate practical applications of the electromagnetic spectrum (e.g., communication, medical, military). **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. (Clarification statement: Include echo and how color is seen but do not cover interference and scattering.) **e.** Analyze and interpret data to predict patterns in the relationship between density of media and wave behavior (i.e., speed). **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. **g.** Develop and use models to demonstrate the effects that lenses have on light (i.e., formation an image) and their possible technological applications.	(Clarification statement: Students should be able to analyze motion graphs, but students should not be expected to calculate velocity or acceleration.) **b.** Construct an explanation using Newton's Laws of Motion to describe the effects of balanced and unbalanced forces on the motion of an object. **c.** 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).

	products and reactants.			
Learning Targets for Supporting Standards with estimated teaching time	a. I can compare and contrast pure substances (elements and compounds) and mixtures. b. I can explain the movement of particles in solids, liquids, gases, and plasma states when thermal energy is added or removed. c. I can carry out investigations to compare and contrast chemical and physical properties of matter. d. I can explain that when a change in a substance occurs, it can be classified as either chemical or physical. e. I can develop models by analyzing patterns within the periodic table. f. I can explain the conservation of matter in a chemical reaction including the resulting differences between products and reactants.	a. I can explain the relationships of kinetic energy to mass and speed, and potential energy to mass and height of an object. b. I can explain the relationship between potential and kinetic Energy. c. I can explain the 7 forms of energy, including: mechanical, chemical, electrical, sound, light, nuclear, and heat. d. I can explain conduction, convection, and radiation as it relates to the collision of atoms	a. I can compare and contrast mechanical and EM waves. b. I can illustrate the relationship between energy and the EM spectrum. c. I can use tools of the lab to demonstrate the behavior of EM waves. d. I can carry out investigation to demonstrate the behavior of waves in various mediums. e. I can analyze patterns of waves through various mediums. f. I can use models to predict frequency and wave speed. g. I can use lenses and mirrors to demonstrate their effect on light.	a. I can interpret data as it relates to speed, distance, velocity and acceleration. b. I can use Newton's 3 Laws of Motion to explain the effects of balanced and unbalanced forces. c. I can demonstrate that the force necessary to move and object is proportional to its mass.

	Unit 5: Non-Contact Forces (6 weeks)	Unit:	Unit:	Unit:
Essential Standard(s)	S8P5. Obtain, evaluate, and communicate information about gravity, electricity, and magnetism as major forces acting in nature. *Gravity, electricity, and magnetism can apply a force without touching an object.			
Learning Targets for Essential Standard(s) with estimated teaching time	I can communicate information about gravity, electricity, and magnetism as non-contact forces in nature.			
Supporting Standards	a. Construct an argument using evidence to support the claim that fields (i.e., magnetic fields, gravitational fields, and electric fields) exist between objects exerting forces on each other even when the objects are not in contact. b. Plan and carry out investigations to demonstrate the distribution of charge in conductors and insulators. c. Plan and carry out investigations to identify the factors (e.g., distance between objects, magnetic force produced by an electromagnet with varying number of wire turns, varying number or size of			

	dry cells, and varying size of iron core) that affect the strength of electric and magnetic forces.			
Learning Targets for Supporting Standards with estimated teaching time	a. I can use evidence to explain that fields (i.e., magnetic fields, gravitational fields, and electric fields) exist between objects exerting forces on each other even when the objects are not in contact. b. I can demonstrate the distribution of charges in conductors and insulators of electricity. c. I can conduct investigations to identify the factors that affect the strength of electric and magnetic forces.			