PHASE IV PHYSICAL SCIENCE CURRICULUM

Course 18000

Phase IV Science is a science program where seventh and eighth grade students will engage in learning from the three disciplines of science: earth science, life science, and physical science. The program engages students in three learning pathways: reading/writing, hands-on activities, and online content and activities. The Physical Science component of this series covers topics like: mater, energy, atomic theory, chemical reactions, forces and motion, machines, energy, heat, light, sound, and electricity.

PHASE IV PHYSICAL SCIENCE OUTLINE:

Goals	Skills	Summative Assessments	Time Frame	Main Resources
• Describe how energy changes when changes matter. • Describe how atomic theory developed. • Explain how atoms are held together in ionic and covalent compounds. • Explain how mass is conserved during a chemical reaction. • Describe the motion of an object as it accelerates. • Describe how balanced and unbalanced forces are related to an object's motion. • Describe and calculate the mechanical advantages of several simple and compound machines. • Explain how energy, work, and power are related. • Describe the basic properties of waves. • Explain what causes current to flow and how resistance affects current.	• Use models to explain scientific concepts and principles. • Recognize and describe reoccurring patterns in the world around us. • Use tools and equipment to make observations and gather scientific data.	End of Chapter Tests	1-year	Pearson: Interactive Science-Physical Science

PHASE IV LIFE PHYSICAL MAP:

TIME FRAME	BIG IDEAS	CONCEPTS	ESSENTIAL QUESTIONS	STANDARDS	OBJECTIVES	DIFFERENTIATION	ASSESSMENT
Chapter 1 Introduction to Matter (1.5 Weeks)	• Everything on Earth is made up of matter. • Every form of matter has physical and chemical properties. • Chemists study matter. • Scientists use a universal system to express units when measuring matter. • The law of conservation of mass states matter cannot be created or destroyed due to chemical or physical changes.	Lesson 1- Describing Matter 1. Matter is anything that has mass and takes up space. 2. Chemistry is the study of matter and how matter changes. 3. A physical property is a characteristic is a characteristic of a substance that can be observed without changing it to another substance. 4. A chemical property is a substances ability to change into different substances. Lesson 2- Classifying Matter 5. An element is a substance that cannot be broken down into any other substances either by chemical or physical means.	Lesson 1 • What is matter? • What is chemistry? • What is a physical property? • What is a chemical property? • How are physical properties and chemical properties similar? How are they different? Lesson 2 • What is matter made of? • What is an element? • What is an atom? • What is a molecule? • What is a compound? • What is a heterogeneous mixture? • What is a homogeneous mixture? Lesson 3 • How is matter measured? • What units are used to express mass and volume? • How is density determined? Lesson 4 • What happens to a substance in a physical change? • What happens to a substance in a chemical change?	3.2.7.A2 Identify atoms as the basic building blocks of matter and that elements are composed of one type of atom. 3.2.7.A3 Explain how energy transfer can affect the chemical and physical properties of matter. 3.2.8.A3 Explain how changes in matter are accompanied by changes in energy. S7.C.1.1.1 Use characteristic physical or chemical properties of matter to distinguish one substance from another (e.g., density, freezing/melting points, solubility, ability to rust). S7.C.1.1.2 Recognize that the atom is the basic building block for all matter. S7.C.1.1.3 Explain the differences between elements, compounds, and mixtures. S7.C.1.1.4 Describe the relationship between mass and volume as density. S7.C.1.2.1 Identify the reactants and products of simple chemical reactions (e.g., photosynthesis, cellular respiration). S7.C.1.2.2	Lesson 1 • Identify the properties used to describe matter. • Describe what chemistry is. • Identify a physical property. • Identify a chemical property. Lesson 2 • Describe what makes up matter. • Describe the properties of a mixture. Lesson 3 • Describe the units to measure mass and volume. • Explain how to determine the density of a material. Lesson 4 • Explain what a physical change is. • Explain what a chemical change is. • Describe how energy changes when changes matter.	Students will be given the following: Preferential seating when applicable Study guides Guided notes when applicable Extended time for assignment when needed Separate testing environment when applicable.	Daily assessments End of chapter exams Labs and classroom activities

		6. A compound is a substance made of two or more elements that are chemically combined in a set ratio. Lesson 3- Measuring Matter 7. Scientists use the International System of Units. 8. Mass it the amount of matter an object has. 9. Volume is the amount of space that matter occupies. 10. Density is a measure of the mass of a material in a given volume. Lesson 4- Changes in Matter 11. A substance that undergoes a physical change is still the same substance after the change. 12. During a chemical change, a substance transforms into another substance. 13. The law of conservation of mass states that	• How are changes in energy and matter related?	Compare the behavior of particle motion in solids, liquids, and gasses. S8.C.1.1.1 Explain the differences among elements, compounds, and mixtures. S8.C.1.1.2 Use characteristic physical or chemical properties to distinguish one substance from another (e.g., density, thermal expansion/contraction, freezing/melting points, streak test S8.C.1.1.3 Identify and describe reactants and products of simple chemical reactions.			

		matter is neither created nor destroyed in any chemical or physical change.					
Chapter 2 Solids, Liquids, and Gases (1 Week)	• The closely packed arrangement of particles in a solid causes it to have a definite shape and volume. • Because its particles are free to move, a liquid has no definite shape. • Gas particles are free to move and fill the space available, therefore they have neither a definite shape nor volume. • At a solid's melting point, its particles vibrate so fast that they break free from their fixed position. • At a liquid's freezing point, its particles are moving so slowly that they begin to take on fixed positions. • Vaporization occurs when the particles in a liquid gain enough energy to move independently. • Condensation occurs when particles in a gas lose enough thermal energy to form a liquid. • During sublimation, particles of a solid do not pass through the liquid state as they form a gas. • Charles's Law • Boyle's Law	Lesson 1 1. A solid has a definite shape and a definite volume. 2. A liquid has a definite volume but not a definite shape. 3. A gas has neither a definite volume nor a definite shape. Lesson 2 4. Melting is a change in state from a solid to a liquid. 5. Freezing is a change in state from a liquid to a solid. 6. Vaporization is a change in state from a liquid to a gas. 7. Condensation is a change in state from a gas to a liquid. 8. Sublimation is a change in state from a solid to a gas. 9. Pressure and temperature of gas are	Lesson 1 • How do you describe a solid? • How do you describe a liquid? • How do you describe a gas? • What is pressure? • How do you calculate pressure? • How do you calculate temperature? Lesson 2 • What happens to particles of a solid when it melts? • What happens to particles of a liquid as it vaporizes? • What happens to particles of a solid as it sublimes? Lesson 3 • How are pressure and temperature of a gas related? • How are volume and temperature of a gas related? • How are pressure and volume of a gas related?	CC.1.2 Reading Informational Text: Students read, understand, and respond to informational text – with emphasis on comprehension, making connections among ideas and between texts with focus on textual evidence. CC.1.2.8.A Determine a central idea of a text and analyze its development over the course of the text, including its relationship to supporting ideas; provide an objective summary of the text. E08.B-K.1.1.1 Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences, conclusions, and/or generalizations drawn from the text. E08.B-K.1.1.2 Determine a central idea of a text and analyze its development over the course of the text, including its relationship to supporting ideas; provide an objective summary of the text. E08.B-K.1.1.3 Analyze how a text makes connections among and distinctions between individuals, ideas, or events (e.g., through comparisons, analogies, categories).	Lesson 1 • Describe the motion of particles in a solid. • Describe the motion of particles in a liquid. • Describe the motion of particles in a gas. Lesson 2 • Explain what happens to a substance during changes between solid and liquid. • Explain what happens to a substance during changes between liquid and gas. • Explain what happens to a substance during changes between solid and gas. Lesson 3 • Explain how pressure and temperature of a gas are related. • Explain how volume and temperature of a gas are related. • Explain how pressure and volume of a gas are related.	Students will be given the following: Preferential seating when applicable Study guides Guided notes when applicable Extended time for assignment when needed Separate testing environment when applicable.	Daily assessments End of chapter exams Labs and classroom activities

		directly proportional. 10. Volume and temperature of a gas are directly proportional. 11. Pressure and volume of a gas are inversely proportional.					
Chapter 3 Getting Started (2 Weeks)	• Atomic theory grew as a series of models that developed from experimental evidence. As more evidence was collected, the theory and models were revised. • Dalton's Atomic Theory • Thompson's Model • Rutherford's Model • Cloud Model • A nucleus containing protons and neutrons is at the center of every atom. • Dmitri Mendeleev is credited for creating the first version of the periodic table. • The periodic table includes the atomic number, chemical symbol, name, and atomic mass for each element. • An element's properties can be predicted from its location on the periodic table. • The physical properties of metals include luster, malleability, ductility, and conductivity. • Families of nonmetals include the carbon family, nitrogen family,	Lesson 1 1. An atom is the smallest particle that can still be considered an element. 2. Electrons are negatively charged particles of an atom. 3. Protons are positively charged particles in an atom. 4. Neutrons are particles in an atom that do not have an electric charge. Lesson 2 5. The atomic mass of an element is the average mass of all the isotopes of that element. 6. A periodic table is an arrangement of elements showing the repeating pattern of their properties.	Lesson 1 • How did atomic theory develop? • What is the modern model of the atom? Lesson 2 • What did Mendeleev discover? • What information does the periodic table contain? • How is the periodic table useful? Lesson 3 • What are the properties of metals? • How are metals classified? Lesson 4 • What are the properties of nonmetals? • What are the families containing nonmetals? Lesson 5 • What happens to an atom during radioactive decay? • What does radioactive decay produce? • How are radioactive isotopes useful?	3.2.10.A1 Predict properties of elements using trends of the periodic table. Identify properties of matter that depend on sample size. Explain the unique properties of water (polarity, high boiling point, forms hydrogen bonds, high specific heat) that support life on Earth. 3.2.8.A2 Identify characteristics of elements derived from the periodic table. 3.2.C.A2 Compare the electron configurations for the first twenty elements of the periodic table. Relate the position of an element on the periodic table to its electron configuration and compare its reactivity to the reactivity of other elements in the table. Explain how atoms combine to form compounds through both ionic and covalent bonding. Predict chemical formulas based on the number of valence electrons.	Lesson 1 • Describe how atomic theory developed. • Describe the modern model of the atom. Lesson 2 • Explain how Mendeleev discovered the pattern that led to the periodic table. • Identify the data about elements found in the periodic table. • Explain how the periodic table is useful. Lesson 3 • Summarize the properties of metals. • Describe how metals are classified in the periodic table. Lesson 4 • Summarize the properties on nonmetals. • Describe the families that contain nonmetals. Lesson 5 • Describe what happens to an atom during radioactive decay. • Identify the types of particles and energy	Students will be given the following: Preferential seating when applicable Study guides Guided notes when applicable Extended time for assignment when needed Separate testing environment when applicable.	Daily assessments End of chapter exams Labs and classroom activities

	oxygen family, halogen family, noble gases, and hydrogen. • During the radioactive decay, the identity of an atom changes	7. A period is a row of a periodic table. 8. A group is a column on the periodic table. Lesson 3 9. Metals are elements that are good conductors of electric current and heat. 10. Physical and chemical properties of metals. 11. The classification of metals. Lesson 4 12. Nonmetals are elements that lack most of the properties of metals. 13. The families that contain nonmetals. 14. Metalloids have some properties of metals and some properties of nonmetals. 15. Lesson 5 16. During radioactive decay, the atomic nuclei of radioactive isotopes release fast-moving particles and energy. 17. Nuclear reactions involve the		Draw Lewis dot structures for simple molecules and ionic compounds. Predict the chemical formulas for simple ionic and molecular compounds. Use the mole concept to determine number of particles and molar mass for elements and compounds. Determine percent compositions, empirical formulas, and molecular formulas. BIO.A.2.2.1 Explain how carbon is uniquely suited to form biological macromolecules. CHEM.A.2.1.1 Describe the evolution of atomic theory leading to the current model of the atom based on the works of Dalton, Thomson, Rutherford, and Bohr. CHEM.A.2.1.2 Differentiate between the mass number of an isotope and the average atomic mass of an element. CHEM.B.1.3.3 Use illustrations to predict the polarity of a molecule. S11.A.1.1.1 Compare and contrast scientific theories, scientific laws, and beliefs (e.g., the universal law of gravitation, how light travels, formation of moons, stages of ecological succession). S11.A.1.1.2	produced by radioactive decay. • Describe how radioactive isotopes are useful.		

		particles in the nucleus of an atom.		Analyze and explain the accuracy of scientific facts, principles, theories, and laws. S11.A.1.1.3 Evaluate the appropriateness of research questions (e.g., testable vs. not-testable). S11.A.1.1.4 Explain how specific scientific knowledge or technological design concepts solve practical problems (e.g., momentum, Newton's universal law of gravitation, tectonics, conservation of mass and energy, cell theory, theory of evolution, atomic theory, theory of relativity, Pasteur's germ theory, relativity, heliocentric theory, ideal gas laws). S11.A.1.1.5 Analyze or compare the use of both direct and indirect observation as means to study the world and the universe (e.g., behavior of atoms, functions of cells, birth of stars). S11.C.1.1.1 Explain that matter is made of particles called atoms and that atoms are composed of even smaller particles (e.g., protons, neutrons, electrons). S11.C.1.1.2 Explain the relationship between the physical properties of a substance and its molecular or atomic structure. S11.C.1.1.3 Explain the formation of compounds (ionic and covalent) and their resulting			

				properties using bonding theories. S11.C.1.1.4 Explain how the relationships of chemical properties of elements are represented in the repeating patterns within the periodic table. S11.C.1.1.5 Predict the behavior of gases through the application of laws (e.g., Boyle's law, Charles' law, or ideal gas law). S11.C.1.1.6 Describe factors that influence the frequency of collisions during chemical reactions that might affect the reaction rates (e.g., surface area, concentration, catalyst, temperature). S8.C.1.1.1 Explain the differences among elements, compounds, and mixtures. S8.C.1.1.2 Use characteristic physical or chemical properties to distinguish one substance from another (e.g., density, thermal expansion/contraction, freezing/melting points, streak test S8.C.1.1.3 Identify and describe reactants and products of simple chemical reactions.			
Chapter 4 Atoms and Bonding (1.5 Weeks)	Lesson 1 • The number of valence electrons in each atom helps determine the chemical properties of that element.	Lesson 1 1. Valence electrons of an atom are those electrons that have the	Lesson 1 • What determines an element's chemistry? Lesson 2 • How do ions form?	3.2.7.A1 Differentiate between elements, compounds, and mixtures. Identify groups of elements that have similar properties.	Lesson 1 • Explain what determines an element's chemistry. Lesson 2	Students will be given the following: Preferential seating when applicable	Daily assessments End of chapter exams

	Lesson 2 • When a neutral atom loses a valence electron, it loses a negative charge and becomes a positive ion. • When a neutral atom gains a valence electron, it gains a negative charge and becomes a negative ion. • Naming ionic compounds. • Formulas for ionic compounds. esson 3 • The attractions between the shared electrons and the protons in the nucleus of each atom hold the atoms together in a covalent bond. Lesson 4 • A metal crystal is composed of closely packed, positively charged metal ions	highest energy. 2. A chemical bond is the force of attraction that holds atoms together. Lesson 2 3. An ion is an atom or group of atoms that has an electric charge. 4. Ions that are made of more than one atom are polyatomic ions. 5. Ionic bond is the attraction between two oppositely charged ions. 6. A chemical formula is a group of symbols that shows the ratio of elements is a compound. Lesson 3 7. The chemical bond formed when 2 atoms share electrons is called a covalent bond. 8. A molecule is a neutral group of atoms joined by covalent bonds. 9. A covalent bond in which electrons are	• How are the formulas and names of ionic compounds written? • What are the properties of ionic compounds? Lesson 3 • How are the atoms held together in a covalent bond? • What are properties of molecular compounds? • How do bonded atoms become partially charged? Lesson 4 • What is the structure of a metal crystal? • What are properties of metals?	Explain how materials are characterized by having a specific amount of mass in each unit of volume (density). 3.2.7.A2 Identify atoms as the basic building blocks of matter and that elements are composed of one type of atom. 3.2.7.A3 Explain how energy transfer can affect the chemical and physical properties of matter. 3.2.7.A4 Describe how reactants change into products in simple chemical reactions. 3.2.8.A1 Differentiate between mass and weight. 3.2.8.A2 Identify characteristics of elements derived from the periodic table. 3.2.8.A4 Compare and contrast physical and chemical changes in terms of products. S7.C.1.1.1 Use characteristic physical or chemical properties of matter to distinguish one substance from another (e.g., density, freezing/melting points, solubility, ability to rust). S7.C.1.1.2 Recognize that the atom is the basic building block for all matter. S7.C.1.1.3	• Explain how ions form. • Explain how the formulas and names of ionic compounds are written. • Identify properties of ionic compounds. Lesson 3 • Describe how atomic theory developed. • Identify properties of molecular compounds. • Explain how bonded atoms become partially charged. Lesson 4 • Describe the structure of a metal crystal. • Identify properties of metals	Study guides Guided notes when applicable Extended time for assignment when needed Separate testing environment when applicable.	Labs and classroom activities

		shared equally is a nonpolar bond. 10. A covalent bond in which electrons are shared unequally is called a nonpolar bond. Lesson 4 11. A metallic bond is an attraction between a positive metal ion and the electrons surrounding it.		Explain the differences between elements, compounds, and mixtures. S7.C.1.1.4 Describe the relationship between mass and volume as density. S7.C.1.2.1 Identify the reactants and products of simple chemical reactions (e.g., photosynthesis, cellular respiration). S7.C.1.2.2 Compare the behavior of particle motion in solids, liquids, and gasses. S8.C.1.1.1 Explain the differences among elements, compounds, and mixtures. S8.C.1.1.2 Use characteristic physical or chemical properties to distinguish one substance from another (e.g., density, thermal expansion/contraction, freezing/melting points, streak test S8.C.1.1.3 Identify and describe reactants and products of simple chemical reactions.			
Chapter 5 Chemical Reactions (1 Week)	Lesson 1 • Changes in matter can be described in terms of physical changes and chemical changes. Lesson 2 • A chemical equation tells you the substances you start with in a reaction and	Lesson 1 1. How can changes in matter be described? 2. How do you identify a chemical reaction? Lesson 2 3. What information	Lesson 1 • How can changes in matter be described? • How do you identify a chemical reaction? Lesson 2 • What information does a chemical equation contain?	3.2.7.A1 Differentiate between elements, compounds, and mixtures. Identify groups of elements that have similar properties. Explain how materials are characterized by having a specific amount of mass in each unit of volume (density).	Lesson 1 • Explain how changes in matter can be described. • Identify ways to tell that a chemical reaction has occurred. Lesson 2 • Identify the information included	Students will be given the following: Preferential seating when applicable Study guides Guided notes when applicable	Daily assessments End of chapter exams Labs and classroom activities

	the substances that are formed at the end. • In a chemical reaction, all of the atoms present at the start of the reaction are present at the end of the reaction. Lesson 3 • All chemical reactions need a certain amount of activation energy to get started. • Factors that can affect rates of reactions include surface area, temperature, concentration, and the presence of catalysts and inhibitors	does a chemical equation contain? 4. How is mass conserved during a chemical reaction? 5. What are three types of chemical reactions? Lesson 3 6. How do reactions get started? 7. What affects the rate of a chemical reaction?	• How is mass conserved during a chemical reaction? • What are three types of chemical reactions? Lesson 3 • How do reactions get started? • What affects the rate of a chemical reaction?	3.2.7.A3 Explain how energy transfer can affect the chemical and physical properties of matter. 3.2.7.A4 Describe how reactants change into products in simple chemical reactions. S7.C.1.1.1 Use characteristic physical or chemical properties of matter to distinguish one substance from another (e.g., density, freezing/melting points, solubility, and ability to rust). S7.C.1.1.2 Recognize that the atom is the basic building block for all matter. S7.C.1.1.3 Explain the differences between elements, compounds, and mixtures. S7.C.1.1.4 Describe the relationship between mass and volume as density. S7.C.1.2.1 Identify the reactants and products of simple chemical reactions (e.g., photosynthesis, cellular respiration). S7.C.1.2.2 Compare the behavior of particle motion in solids, liquids, and gasses.	in a chemical equation. • Explain how mass is conserved during a chemical reaction. • Identify three categories of chemical reactions. Lesson 3 • Explain how activation energy is related to chemical reactions. • Identify factors that affect the rate of a chemical reaction.	Extended time for assignment when needed Separate testing environment when applicable.	
Chapter 6 Acids, Bases, and Solutions (1.5 Weeks)	Lesson 1 • A mixture is classified as a solution, colloid, or suspension based on the size of its largest particles.	Lesson 1 1. A solution is a mixture containing a solvent and at least one solute and	Lesson 1 • How are mixtures chaffed? • How does a solution form? Lesson 2	3.2.7.A1 Differentiate between elements, compounds, and mixtures. Identify groups of elements that have similar properties.	Lesson 1 • Identify how mixtures are classified. • Describe how a solution form. Lesson 2	Students will be given the following: Preferential seating when applicable	Daily assessments End of chapter exams

	• A solution forms when particles of the solute separate from each other and become surrounded by particles of the solvent. Lesson 2 • Factors that can affect the solubility of a substance include pressure, the type of solvent, and temperature. Lesson 3 • An acid reacts with metals and carbonates, tastes sour, and turns blue litmus paper red. • A base tastes better, feels slippery, and turns red litmus paper blue.	has the same properties throughout. 2. A colloid is a mixture containing small, undissolved particles that do not settle out. 3. A suspension is a mixture in which particles can be seen and easily separated by settling or filtration. Lesson 2 4. Solubility is a measure of how much solute can dissolve in a solvent at a given temperature.	• How is concentration changed? • What factors affect solubility? Lesson 3 • What are the properties of acids? • What are the properties of bases?	Explain how materials are characterized by having a specific amount of mass in each unit of volume (density). 3.2.7.A3 Explain how energy transfer can affect the chemical and physical properties of matter. S7.C.1.1.1 Use characteristic physical or chemical properties of matter to distinguish one substance from another (e.g., density, freezing/melting points, solubility, and ability to rust). S7.C.1.1.3 Explain the differences between elements, compounds, and mixtures.	• Describe how to change concentration. • Identify the factors that affect the solubility of a substance. Lesson 3 • Describe the properties of acids. • Describe the properties of bases.	Study guides Guided notes when applicable Extended time for assignment when needed Separate testing environment when applicable.	Labs and classroom activities
Chapter 7 Motion (1.5 Weeks)	Lesson 1 • An object is in motion if it changes position relative to a reference point. Lesson 2 • To calculate the speed of an object, divide the distance the object travels by the amount of time it takes to travel the distance. • When you know both the speed and direction of an object's motion, you know the velocity of the object. Lesson 3 • In science, acceleration refers to increasing speed,	Lesson 1 1. An object is in motion if its position changes relative to another object. 2. Scientists use a universal system of measurement called the International System of Units. Lesson 2 3. The speed of an object is the distance the object moves per unit of time.	Lesson 1 • When is an object in motion? Lesson 2 • How do you calculate speed? • How do you describe velocity? • How do you graph motion? Lesson 3 • How do you graph acceleration? • What is acceleration?	3.2.7.B1 Describe how unbalanced forces acting on an object change its velocity. Analyze how observations of displacement, velocity, and acceleration provide necessary and sufficient evidence for the existence of forces. 3.2.7.B2 Describe how energy can be changed from one form to another (transformed) as it moves through a system or transferred from one system to another system. S7.C.3.1.1	Lesson 1 • Determine when an object is in motion. Lesson 2 • Calculate an objects speed. • Describe what velocity is. • Demonstrate how to graph motion. Lesson 3 • Describe the motion of an object as it accelerates. • Demonstrate how to graph acceleration.	Students will be given the following: Preferential seating when applicable Study guides Guided notes when applicable Extended time for assignment when needed Separate testing environment when applicable.	Daily assessments End of chapter exams Labs and classroom activities

	decreasing speed, or changing direction. • You can use both a speed-versus-time graph and a distance-versus-time graph to analyze the motion of an acceleration object.	4. Velocity is the speed in a given direction. Lesson 3 5. Acceleration is the rate at which velocity changes		Describe how unbalanced forces acting on an object change its velocity. S7.C.3.1.2 Describe forces acting on an object (e.g., friction, gravity, balanced verses unbalanced). S7.C.3.1.3 Explain the mechanical advantages of simple machines.			
Chapter 8 Forces (2 Weeks)	Lesson 1 • A force is described by its strength and by the direction in which it acts. • A nonzero net force causes a change in the object's motion. Lesson 2 • Two factors that affect the force of friction are the types of surfaces involved and how hard the surfaces are pushed together. • Two factors affect the gravitational attraction between objects: mass and distance. Lesson 3 • Newton's First Law of Motion • Newton's Second Law of Motion • Newton's Third Law of Motion Lesson 4 • The momentum of a moving object can be determined by multiplying the object's mass by its velocity. • The Law of Conservation of Momentum Lesson 5	Lesson 1 1. A force is a push or a pull. 2. The strength of a force is measured in the SI unit called the newton. 3. The combination of all the forces on an object is called the net force. Lesson 2 4. The force that two surfaces exert on each other when they rub against each other is called friction. 5. Gravity is a force that pulls objects toward each other. 6. Mass is the measure of the amount of matter in an object. 7. Weight is the measure of the force of	Lesson 1 • How are forces described? • How do forces affect motion? Lesson 2 • What factors affect friction? • What factors affect gravity? Lesson 3 • What is Newton's First Law of Motion? • What is Newton's Second Law of Motion? • What is Newton's Third Law of Motion? Lesson 4 • What is an object's momentum? Lesson 5 • What is free fall? • What keeps a satellite in orbit? Lesson 6 • What makes things float? • What will float?	3.2.7.B1 Describe how unbalanced forces acting on an object change its velocity. Analyze how observations of displacement, velocity, and acceleration provide necessary and sufficient evidence for the existence of forces. 3.2.7.B2 Describe how energy can be changed from one form to another (transformed) as it moves through a system or transferred from one system to another system. S7.C.3.1.1 Describe how unbalanced forces acting on an object change its velocity. S7.C.3.1.2 Describe forces acting on an object (e.g., friction, gravity, balanced verses unbalanced). S7.C.3.1.3 Explain the mechanical advantages of simple machines.	Lesson 1 • Describe what a force is. • Describe how balanced and unbalanced forces are related to an object's motion. Lesson 2 • Describe friction and identify factors that determine the friction between two objects. • Identify the factors that affect the gravitational force between two objects. Lesson 3 • State Newton's first law of motion. • State Newton's second law of motion. • State Newton's third law of motion. Lesson 4 • Explain how momentum is determined and conserved. Lesson 5 • Describe the motion of an object during free fall. • Describe the factors that keep objects in orbit around Earth.	Students will be given the following: Preferential seating when applicable Study guides Guided notes when applicable Extended time for assignment when needed Separate testing environment when applicable.	Daily assessments End of chapter exams Labs and classroom activities

	• Free fall motion is where the acceleration is caused by gravity. • Satellites in orbit around Earth continuously fall toward Earth, but because Earth is curved they travel around it. Lesson 6 • Buoyant force acts in the opposite direction to the force of gravity, so it makes an object feel lighter. • To predict whether an object will sink or float, you can compare the densities of the object and the fluid it is in, or you can find the net force acting on the object.	gravity on an object. Lesson 3 8. Inertia is resistance to change in motion. Lesson 4 9. Momentum is a characteristic of a moving object that is related to the mass and the velocity of the object. Lesson 5 10. When the only force acting on an object is gravity, the object is said to be in free fall. 11. A force that causes an object to move in a circular path is a centripetal force. Lesson 6 12. Buoyant force is the upward force exerted on a submerged object.			Lesson 6 • Describe the effect of the buoyant force. • Describe how comparative densities determine buoyancy.		
Chapter 9 Work and Machines (1.5 Weeks)	Lesson 1 • Work is done on an object when the object moves in the same direction in which the force is exerted. • The amount of work done on an object can be determined by multiplying force times distance.	Lesson 1 1. Power is the rate at which work is done. Lesson 2 2. Machines are devices that allow you to do work in an easier way. 3. Input force is the force you	Lesson 1 • How is work defined? • What is power? Lesson 2 • What does a machine do? • What is the mechanical advantage? • What is efficiency?	3.2.7.B1 Describe how unbalanced forces acting on an object change its velocity. Analyze how observations of displacement, velocity, and acceleration provide necessary and sufficient evidence for the existence of forces.	• Lesson 1 • Define and calculate the work done on an object. • Define and calculate power. • Lesson 2 • Explain how machines make work easier.	Students will be given the following: Preferential seating when applicable Study guides Guided notes when applicable	Daily assessments End of chapter exams Labs and classroom activities

	• Power equals the amount of work done on an object in a unit of time. Lesson 2 • A machine makes work easier by changing at least one of three factors: the amount of force you exert, the distance over which you exert your force, or the direction in which you exert your force. • The ratio of output force to input force is the mechanical advantage of a machine. Lesson 3 • An inclined plane allows you to exert your input of force over a longer distance. • The threads of a screw act like an inclined plane to increase the distance over which you exert the input force. • Levers are classified according to the location of the fulcrum relative to the input and output forces. Lesson 4 • Two simple machines take advantage of turning: the pulley and the wheel and axle. • Within a compound machine, the output force of one simple machine becomes the input force of another simple machine.	exert when you do work. 4. A machine's mechanical advantage is the number of times a machine increases a force exerted on it. 5. The efficiency of a machine compares output work to input work. Lesson 3 6. A simple machine is the most basic device for making work easier. 7. An inclined plane is a flat, sloped surface. 8. A screw is a simple machine that is related to the inclined plane. 9. A lever is a rigid bar that is free to pivot or rotate on a fixed point. Lesson 4 10. A pulley is a simple machine made of a grooved wheel with a rope or cable wrapped around it. 11. A simple machine made of two connected	Lesson 3 • How do inclined planes work? • How are levers classified? Lesson 4 • What simple machines make use of turning? • How does a compound machine do work?	3.2.7.B2 Describe how energy can be changed from one form to another (transformed) as it moves through a system or transferred from one system to another system. S7.C.3.1.1 Describe how unbalanced forces acting on an object change its velocity. S7.C.3.1.2 Describe forces acting on an object (e.g., friction, gravity, balanced verses unbalanced). S7.C.3.1.3 Explain the mechanical advantages of simple machines.	• Calculate the mechanical advantage of a machine. • Calculate the efficiency of a machine. • Lesson 3 • Describe and calculate the mechanical advantages of inclined planes, wedges, and screws. • Classify, describe, and calculate the mechanical advantages of levers. • Lesson 4 • Describe and calculate the mechanical advantages of pulleys and wheels and axles. • Describe and calculate the mechanical advantages of compound machines.	Extended time for assignment when needed Separate testing environment when applicable.	

		objects that rotate about a common axis is called a wheel and axle. 12. A machine that combines two or more simple machines is called a compound machine.					
Chapter 10 Energy (1 Week)	Lesson 1 • Power is the amount of energy transferred in a unit of time. • The two basic types of energy are kinetic and potential energy. Lesson 2 • Forms of energy associated with the particles of objects include nuclear energy, thermal energy, electrical energy, electromagnetic energy, and chemical energy. Lesson 3 • All forms of energy can be transformed into other forms of energy.	Lesson 1 1. Energy is the ability to do work. 2. The energy an object has due to its motion is called kinetic energy. 3. Energy that results from the position or shape of an object is called potential energy. Lesson 2 4. The form of energy associated with the motion, position, or shape of and object is called mechanical energy. Lesson 3 5. A change from one form of energy to another is called an energy	Lesson 1 • How are energy, work, and power related? • What are two types of energy? Lesson 2 • How can you find an object's mechanical energy? • What are other forms of energy? Lesson 3 • How are different forms of energy related? • What is the Law of Conservation of Energy?	3.2.7.B1 Describe how unbalanced forces acting on an object change its velocity. Analyze how observations of displacement, velocity, and acceleration provide necessary and sufficient evidence for the existence of forces. 3.2.7.B2 Describe how energy can be changed from one form to another (transformed) as it moves through a system or transferred from one system to another system. S7.C.3.1.1 Describe how unbalanced forces acting on an object change its velocity. S7.C.3.1.2 Describe forces acting on an object (e.g., friction, gravity, balanced verses unbalanced). S7.C.3.1.3 Explain the mechanical advantages of simple machines.	Lesson 1 • Explain how energy, work, and power are related. • Name and describe the two basic types of energy. Lesson 2 • Explain how to determine an object's mechanical energy. • List other forms of energy. Lesson 3 • Explain how different forms of energy are related. • State the law of conservation of energy.	Students will be given the following: Preferential seating when applicable Study guides Guided notes when applicable Extended time for assignment when needed Separate testing environment when applicable.	Daily assessments End of chapter exams Labs and classroom activities

		transformation. 6. The law of conservation of energy states that when one form of energy is transformed to another, no energy is lost in the process.					
Chapter 11 Thermal Energy and Heat (1 Week)	Lesson 1 • Temperature is a measure of the average kinetic energy of the particles in an object. • Thermal energy is the total energy of all the particles in an object. Lesson 2 • Heat is transferred from warmer areas to cooler areas by conduction, convection, and radiation. Lesson 3 • Some materials conduct heat well, while other materials do not. • To change the temperature of different objects by the same amount, different amounts of thermal energy are required. • As the thermal energy of matter increases, its particles usually spread out, causing the substance to expand.	Lesson 1 1. Temperature is a measure of the average kinetic energy of the particles in an object. 2. Thermal energy is the total energy of all the particles in an object. Lesson 2 3. Heat is transferred from warmer areas to cooler areas by conduction, convection, and radiation. Lesson 3 4. Some materials conduct heat well, while other materials do not. 5. To change the temperature of different objects by the same amount, different	Lesson 1 • Absolute zero is the lowest temperature possible at which particles have no kinetic energy. • Heat is the transfer of thermal energy from a warmer object to a cooler object. Lesson 2 • Convection is a type of heat transfer that occurs only in fluids. • Radiation is the transfer of energy by electromagnetic waves. • Conduction transfers heat from one particle of matter to another. Lesson 3 • A conductor is a material that conducts heat well. • Insulators are materials that do not conduct heat well?	3.2.7.B2 Describe how energy can be changed from one form to another (transformed) as it moves through a system or transferred from one system to another system. 3.4.10.E3 Compare and contrast the major forms of energy: thermal, radiant, electrical, mechanical, chemical, nuclear and others. S11.A.1.1.2 Analyze and explain the accuracy of scientific facts, principles, theories, and laws. S11.A.2.2.1 Evaluate appropriate methods, instruments, and scale for precise quantitative and qualitative observations (e.g., to compare properties of materials, water quality)	Lesson 1 • Explain temperature and how it is measured. • Explain how heat is related to temperature and thermal energy. Lesson 2 • Describe the three forms of heat transfer. Lesson 3 • Use specific heat, conductors and insulators, and thermal expansion to describe how materials respond to heat.	Students will be given the following: Preferential seating when applicable Study guides Guided notes when applicable Extended time for assignment when needed Separate testing environment when applicable.	Daily assessments End of chapter exams Labs and classroom activities

		amounts of thermal energy are required. 6. As the thermal energy of matter increases, its particles usually spread out, causing the substance to expand.					
Chapter 12 Characteristics of Waves (1 Week)	Lesson 1 • Mechanical waves form when a source of energy causes a medium to vibrate. • Three types of mechanical waves are transverse waves, longitudinal waves, and surface waves. Lesson 2 • Amplitude describes how far the medium in a wave moves. • Wavelength describes a wave's length. • Frequency describes how often it occurs. • Speed describes how quickly a wave moves. Lesson 3 • Waves change direction by reflection, refraction, and diffraction. • There are two types of interference: constructive and destructive.	Lesson 1 1. Mechanical waves form when a source of energy causes a medium to vibrate. 2. Three types of mechanical waves are transverse waves, longitudinal waves, and surface waves. Lesson 2 3. Amplitude describes how far the medium in a wave moves. 4. Wavelength describes a wave's length. 5. Frequency describes how often it occurs. 6. Speed describes how quickly a wave moves. Lesson 3	Lesson 1 • A wave is a disturbance involving the transfer of energy from place to place. • Mechanical waves are waves that require a medium to travel. • A high point in a wave is called a crest, the low point is called a trough. Lesson 2 • Amplitude is the maximum distance the medium vibrates from the rest point. • The distance between two corresponding parts of a wave is its wavelength. • The frequency of a wave is the number of waves that pass a given point in a certain amount of time. Lesson 3 • Reflection occurs when any part of a wave cannot pass	3.2.10.B5 Understand that waves transfer energy without transferring matter. Compare and contrast the wave nature of light and sound. Describe the components of the electromagnetic spectrum. Describe the difference between sound and light waves. S11.C.3.1.5 Calculate the mechanical advantage for moving an object by using a simple machine. S8.A.3.3.2 Describe repeating structure patterns in nature (e.g., veins in a leaf, tree rings, crystals, water waves) or periodic patterns (e.g., daily, monthly, annually).	Lesson 1 • Explain what causes mechanical waves. • List and describe three types of mechanical waves. Lesson 2 • Describe the basic properties of waves. • Explain how a wave's speed is related to its wavelength and frequency. Lesson 3 • Describe how reflection, refraction, and diffraction change a wave's direction. • State the different types of interference. • Explain how standing waves form.	Students will be given the following: Preferential seating when applicable Study guides Guided notes when applicable Extended time for assignment when needed Separate testing environment when applicable.	Daily assessments End of chapter exams Labs and classroom activities

		7. Waves change direction by reflection, refraction, and diffraction. 8. There are two types of interference: constructive and destructive.	through a surface and therefore bounces back. • Refraction is the bending of waves due to a change in speed. • Diffraction occurs when waves bend around barriers or pass through openings. The waves bend and spread out. • Interference is the interaction between waves that meet				
Chapter 13 Sound (1.5 Weeks)	Lesson 1 • Sound is a disturbance that travels through a medium as a longitudinal wave. • The speed of sound depends on the temperature, stiffness, and density of the medium the sound travels through. Lesson 2 • The pitch of a sound you hear depends on the frequency of the sound wave. • The loudness of a sound depends on the energy and intensity of the sound wave. • The Doppler Effect occurs because the motion of the source causes the waves to either get closer together or spread out. Lesson 3 • The sound quality of musical instruments results from blending a fundamental tone with its overtones. Lesson 4	1. The pitch of a sound is a description of how high or low the sound seems to a person. 2. Loudness describes your awareness of the energy of sound. 3. The amount of energy a sound wave carries per second through a unit area is its intensity. 4. The change in frequency of a wave as its source moves in relation to an observer is called the Doppler Effect. 5. The lowest natural frequency is	Lesson 1 • What is sound? • What factors affect the speed of sound? Lesson 2 • What affects pitch? • What affects loudness? • What causes the Doppler Effect? Lesson 3 • What determines sound quality? Lesson 4 • How do your ears work? Lesson 5 • How do animals and people use sound?	3.2.10.B5 Understand that waves transfer energy without transferring matter. Compare and contrast the wave nature of light and sound. Describe the components of the electromagnetic spectrum. Describe the difference between sound and light waves. 3.2.7.B5 Demonstrate that visible light is a mixture of many different colors. Explain the construct of the electromagnetic spectrum. Describe how sound and light energy are transmitted by waves. S8.A.3.3.2 Describe repeating structure patterns in nature (e.g., veins in a leaf, tree rings, crystals,	Lesson 1 • Define sound. • Identify factors that affect the speed of sound. Lesson 2 • State what the pitch of a sound depends on. • Identify factors that affect the loudness of a sound. • Explain what causes the Doppler Effect. Lesson 3 • Identify what determines the sound quality of a musical instrument. Lesson 4 • Describe the function of the human ear. • Lesson 5 • Describe how animals and people use sound.	Students will be given the following: Preferential seating when applicable Study guides Guided notes when applicable Extended time for assignment when needed Separate testing environment when applicable.	Daily assessments End of chapter exams Labs and classroom activities

	• Your ear gathers sound waves and sends information about sound to your brain. Lesson 5 • Some animals, including bats and dolphins, use echolocation to navigate and find food. • People use ultrasound technologies, such as sonar and ultrasound imaging, to observe things that they cannot see directly	called a fundamental tone. 6. Higher natural frequencies are called overtones. 7. Echolocation is the use of reflected sound waves to determine distances or to locate objects. 8. Ultrasound are sound waves with frequencies above the normal human range of hearing		water waves) or periodic patterns (e.g., daily, monthly, annually).			
Chapter 14 Electromagnetic Waves (1 Week)	Lesson 1 • An electromagnetic wave is made up of vibrating electric and magnetic fields that move through space or some medium at the speed of light. • Two different models are needed to explain the behavior of electromagnetic waves. Lesson 2 • All electromagnetic waves travel at the same speed in a vacuum, but they have different wavelengths and different frequencies. • The electromagnetic spectrum is made up of radio waves, microwaves, infrared rays, visible light, ultraviolet rays, X-rays, and gamma rays.	1. An electromagnetic wave is made up of vibrating electric and magnetic fields that move through space or some medium at the speed of light. 2. Both a wave model and a particle model are needed to accurately explain the behavior of electromagnetic waves. 3. All electromagnetic waves travel at the same speed in a vacuum, but they have	Lesson 1 • What makes up an electromagnetic wave? • What models explain how electromagnetic waves behave? Lesson 2 • How do electromagnetic waves compare? • What makes up the electromagnetic spectrum? Lesson 3 • How do radio waves transmit information? • How does a cell phone work? • How does satellite communication work?	3.2.10.B5 Understand that waves transfer energy without transferring matter. Compare and contrast the wave nature of light and sound. Describe the components of the electromagnetic spectrum. Describe the difference between sound and light waves. 3.2.7.B5 Demonstrate that visible light is a mixture of many different colors. Explain the construct of the electromagnetic spectrum. Describe how sound and light energy are transmitted by waves.	Lesson 1 • State what an electromagnetic wave consists of. • List and describe the models that explain the behavior of electromagnetic waves. Lesson 2 • Explain how electromagnetic waves are alike and how they are different. • Describe the waves that make up the electromagnetic spectrum. Lesson 3 • Explain how radio waves transmit information. • Explain how cell phones work. • Explain how communications satellites work.	Students will be given the following: Preferential seating when applicable Study guides Guided notes when applicable Extended time for assignment when needed Separate testing environment when applicable.	Daily assessments End of chapter exams Labs and classroom activities

	Lesson 3 • Radio waves carry information from the antenna of a broadcasting station to the receiving antenna of your radio. • Cell phones transmit and receive signals using high-frequency microwaves. • Communications satellites receive radio, television, and telephone signals and relay the signals to receivers on Earth.	different wavelengths and different frequencies. 4. The electromagnetic spectrum is made up of radio waves, microwaves, infrared rays, visible light, ultraviolet rays, X-rays, and gamma rays. 5. Radio waves carry information from the antenna of a broadcasting station to the receiving antenna of your radio. 6. Cell phones transmit and receive signals using high frequency microwaves. 7. Communications satellites receive radio, television, and telephone signals and relay the signals to receivers on Earth.		S8.A.3.3.2 Describe repeating structure patterns in nature (e.g., veins in a leaf, tree rings, crystals, water waves) or periodic patterns (e.g., daily, monthly, annually).			
Chapter 15 Light (1.5 Weeks)	Lesson 1 • The color of an opaque object is the color of the light it reflects. • The color of a transparent or translucent object is	1. A material that transmits most of the light that strikes it is transparent. 2. A translucent material scatters the	Lesson 1 • What determines color? • How do colors combine? Lesson 2 • What are the kinds of reflection?	3.2.10.B5 Understand that waves transfer energy without transferring matter. Compare and contrast the wave nature of light and sound.	Lesson 1 • Describe what determines the color of an opaque, transparent, or translucent object.	Students will be given the following: Preferential seating when applicable Study guides	Daily assessments End of chapter exams

	the color of the light it transmits. • When the three primary colors of light are combined in equal amounts, they produce white light. • When the three primary colors of pigments are combined in equal amounts, they produce black. Lesson 2 • The two ways in which a surface can reflect light are regular reflection and diffuse reflection. • a plane mirror produces a virtual image that is upright and the same size as the object. • Concave mirrors can produce real or virtual images. • A convex mirror produces a virtual image that is always smaller than the object. Lesson 3 • When light rays enter a new medium at an angle, the change in speed causes the rays to bend. • The type of image formed by a lens depends on the shape of the lens and the position of the object. Lesson 4 • You see objects when a process occurs that involved both your eyes and your brain.	light that passes through it. 3. A material that reflects or absorbs all of the light that strikes it is opaque. 4. Regular reflection occurs when parallel rays of light hit a smooth surface. 5. Diffuse reflection occurs when parallel rays of light hit an uneven surface. 6. A lens is a curved piece of glass or other transparent material that refracts light.	• What types of images do mirrors produce? Lesson 3 • What causes light rays to bend? • What determines the type of image formed by a lens? • Lesson 4 • How do you see objects?	Describe the components of the electromagnetic spectrum. Describe the difference between sound and light waves. 3.2.7.B5 Demonstrate that visible light is a mixture of many different colors. Explain the construct of the electromagnetic spectrum. Describe how sound and light energy are transmitted by waves. S8.A.3.3.2 Describe repeating structure patterns in nature (e.g., veins in a leaf, tree rings, crystals, water waves) or periodic patterns (e.g., daily, monthly, annually).	• Explain how mixing pigments is different from mixing light. Lesson 2 • Identify the types of reflection. • Describe the types of images produced by plane, concave, and convex mirrors. Lesson 3 • Explain why light rays bend when they enter a medium at an angle. • Identify what determines the types of images formed by convex and concave lenses. Lesson 4 • Explain how one sees objects.	Guided notes when applicable Extended time for assignment when needed Separate testing environment when applicable.	Labs and classroom activities
Chapter 16 Electricity (1.5 Weeks)	Lesson 1 • Charges that are the same repel each other. Charges that are	1. Electric Charge and Static 2. Electric Current	Lesson 1 • How do charges interact? • How does charge build up?	3.2.7.B4 Explain how electrical current is produced by the flow of electrons.	Lesson 1 • Explain how electric charges and fields interact.	Students will be given the following:	Daily assessments

	different attract each other. Lesson 2 • When electric charges are made to flow through a material, they produce an electric current. Lesson 3 • All electric circuits have these basic features: devices that run on electrical energy, sources of electrical energy, and conducting wires. Lesson 4 • Power is calculated by multiplying voltage by current. • Electric shocks can be prevented with devices that redirect current or break circuits.	3. Electric Circuits 4. Electric Power and Safety.	Lesson 2 • How is electric current made? • How do conductors differ from insulators? • What affects current flow? Lesson 3 • What did Ohm discover? • What is a circuit made of? Lesson 4 • How do you calculate electric power and energy? • How can electric shocks be prevented?	Explain and demonstrate how electric current produces magnetic forces and how moving magnets produce electric current. 3.2.8.B4 Compare and contrast atomic properties of conductors and insulators.	• Describe how static electricity builds up and transfers. Lesson 2 • Explain how an electric current is produced. • Explain how conductors are different from insulators. • Explain what causes current to flow and how resistance affects current. Lesson 3 • Explain Ohm's Law. • Describe the basic features of an electric series and parallel circuits. Lesson 4 • Explain how to calculate electric power and energy use. • Describe measures that help protect people from electrical shock and short circuits.	Preferential seating when applicable Study guides Guided notes when applicable Extended time for assignment when needed Separate testing environment when applicable.	End of chapter exams Labs and classroom activities
Chapter 17 Magnetism and Electromagnetism (1.5 Weeks)	Lesson 1 • Magnetic poles that are alike repel each other. Magnetic poles that are unlike attract each other. Lesson 2 • Magnetic field lines spread out from one pole, curve around the magnet, and return to the other pole. • Just like a bar magnet, Earth has a magnetic field around it and two magnetic poles. Lesson 3 • An electric current produces a magnetic field.	1. What is magnetism? 2. Magnetic Fields 3. Electromagnetic Force 4. Electricity, Magnetism, and Motion 5. Electricity from Magnetism.	Lesson 1 • What are the properties of magnets? • How do magnetic poles interact? Lesson 2 • What is a magnetic field's shape? • What is Earth's magnetic field like? Lesson 3 • How are electric currents and magnetic fields related? • What is a magnetic field	3.2.7.B4 Explain how electrical current is produced by the flow of electrons. Explain and demonstrate how electric current produces magnetic forces and how moving magnets produce electric current. 3.2.8.B4 Compare and contrast atomic properties of conductors and insulators. S7.C.1.2.2 Compare the behavior of particle motion in solids, liquids, and gasses.	Lesson 1 • Identify and describe the properties of magnets. • Explain how magnetic poles interact. Lesson 2 • Describe a magnetic field. • Describe Earth's magnetic field. Lesson 3 • Explain how electric current is related to magnetism. • Identify some characteristics of a magnetic field	Students will be given the following: Preferential seating when applicable Study guides Guided notes when applicable Extended time for assignment when needed Separate testing	Daily assessments End of chapter exams Labs and classroom activities

	Lesson 4 • When a wire with a current is placed in a magnetic field, electrical energy is transformed into mechanical energy. • An electric motor transforms electrical energy into mechanical energy. Lesson 5 • An electric current is induced in a conductor when the conductor moves through a magnetic field.		produced by a current like? • What are the characteristics of solenoids and electromagnets? Lesson 4 • How is electrical energy transformed into mechanical energy? • How does a Galvanometer work? • What does an electric motor do? Lesson 5 • How can an electric current be produced in a conductor? • How does a generator work? • What does a transformer do?	S7.C.2.1.2 Describe how energy is transferred and conserved in a closed system. S8.C.2.1.1 Distinguish among forms of energy (e.g., electrical, mechanical, chemical, light, sound, nuclear) and sources of energy (i.e., renewable and nonrenewable energy)	produced by a current. • Describe the characteristics of solenoids and electromagnets. Lesson 4 • Explain how electrical energy can be transformed into mechanical energy. • Describe how galvanometers work. • Describe how electric motors work. Lesson 5 • Explain how an electric current can be produced in a conductor. • Describe how a generator works. • Describe the function of a transformer.	environment when applicable.	