Select a Course:	Science Grade 8
Teacher:	CORE Science Grade 8
Course:	Science Grade 8
Year:	2016-17
Months:	- All -

August

Grade 8 Science Water Quality

Human activities have altered the biosphere, sometimes damaging it, although changes to environments can have different impacts for different living things. Activities and technologies can be engineered to reduce people's impacts on Earth.

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language
• Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. • Organisms, and populations of organisms, are depedent on their environmental interactions both with other living things and with nonliving factors. • In any ecosystem, organisms, and populations with similar requirements for food, water, oxygen or other resources may compete with each other for limited resources, access to which consequently contrains their growth and reproduction.	• How is the environment comprised by human activity? • How much environmental risk can we live with? • What processes do scientists use to draw conclusions about human impact of the environment? • How do we protect water quality? • How does use of chemcials impact the ecological health of a system?	MS-ESS3.1 - Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes. MS-ESS3.4 - Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. MS-LS2.1 - Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. MS-LS2.2 - Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. MS-LS2.3 - Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. MS-LS2.4 - Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. MS-LS2.5 - Evaluate competing design solutions for maintaining biodiversity and ecosystem services.* RST.6-8.1 - Cite specific textual evidence to support analysis of science and technical texts. RST.6-8.3 - Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	Discuss how aquifers and aquitards affect ground water movement and contamination. Explain situations in which limiting factors of ecosystems are disrupted. Study the impact of water treatment systems. Conduct experiments with manipulated and responding variables. Investigate which limiting factors of ecosystems can be disrupted. Investigate the environmental effect of introducing a substance that causes biological harm to the ecosystem. Investigate the role of aquifers and aquitards in ground water contamination.	- acid rain - biological contamination - boiling - chemical contamination - chemical reaction - chlorine - chlorination - coagulate - coagulation - compound - concentration - condensation - contaminant - contaminate - contamination - density - dependent variable - dissolved solids - distilled water - element - evaporation - evidence - groundwater - hypothesis - independent variable - inference - microorganism - molecule - particles - parts per billion - parts per million - pH - polluted - precipitate - saturated - saturation - sediment - sedimentation - soluble - solubility - insoluble - solute

			RST.6-8.7 - Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). RST.6-8.9 - Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. IL.SEL.6-8.2.A.3a - Predict others' feelings and perspectives in a variety of situations. IL.SEL.6-8.2.A.3b - Analyze how one's behavior may affect others. IL.SEL.6-8.2.C.3a - Analyze ways to establish positive relationships with others. IL.SEL.6-8.2.C.3b - Demonstrate cooperation and teamwork to promote group effectiveness. IL.SEL.6-8.3.A.3a - Evaluate how honesty, respect, fairness, and compassion enable one to take the needs of others into account when making decisions. IL.SEL.6-8.3.B.3a - Analyze how decision-making skills improve study habits and academic performance. G6-8:3.1 - Explain and demonstrate effective searching and browsing strategies when working on projects. G6-8:3.4 - Independently use appropriate technology tools (e.g., graphic organizer) to define problems and propose hypotheses. G6-8:3.7 - Plan, design, and develop a multimedia product to present research findings and creative ideas effectively, citing sources. G6-8:3.9 - Use a variety of telecommunication tools (e.g., e-mail, discussion groups, Web pages, blogs, Web conferences) to collaborate and communicate with peers, experts, and other audiences (at district's discretion).		- solution - solvent - spring water - substance - surface water - turbidity - vapor - water cycle - water pollution - waterborne disease
September	**Enduring Understandings**	**Essential Questions**	**Standards**	**Knowledge & Skills**	**Academic Language**
	Enduring Understandings	**Essential Questions**	**Standards**	**Knowledge & Skills**	**Academic Language**

October

November

Grade 8 Science Chemistry: Introduction to Matter

• The fact that matter is composed of atoms and molecules can be used to explain the properties of substances, diversity of materials, states of matter, phase changes, and conservation of matter.

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language
• Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it. • Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants. • Some chemical reactions release energy, others store energy.	• Are elements and compounds necessary for life? • How does the structure of matter affect its properties and behaviors? • Explain the role of subatomic particles to properties and behaviors of matter. • How does the relationship of energy change to matter on the molecular/atomic level?	MS-PS1.1 - Develop models to describe the atomic composition of simple molecules and extended structures. MS-PS1.2 - Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. MS-PS1.3 - Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. MS-PS1.5 - Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. MS-PS1.6 - Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.* RST.6-8.1 - Cite specific textual evidence to support analysis of science and technical texts. RST.6-8.3 - Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. RST.6-8.4 - Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics. RST.6-8.6 - Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text. RST.6-8.7 - Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). RST.6-8.8 - Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.	Conduct experiments with manipulated and responding variables. Collect and record data, analyze and chart results according to specific design criteria. Apply concepts that describe properties of matter and energy and the interactions between them.	- acid - acidic - Alkali Metals - Alkaline Earth Metals - atom - atomic mass - atomic number - base - basic - chemical change - chemical property - change of state - colloid - compound - condensation - density - electron - electron cloud - element - Halogen - inertia - isotope - mass - mass number - metal - metalloid - mixture - neutron - non-metal - nucleus - pH - period - periodic - Periodic Law - physical change - physical property - proton - solubility - solution - solute - solvent - suspension - sublimation

			RST.6-8.9 - Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. RST.6-8.5 - Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic. IL.SEL.6-8.2.A.3a - Predict others' feelings and perspectives in a variety of situations. IL.SEL.6-8.2.A.3b - Analyze how one's behavior may affect others. IL.SEL.6-8.2.C.3a - Analyze ways to establish positive relationships with others. IL.SEL.6-8.2.C.3b - Demonstrate cooperation and teamwork to promote group effectiveness. IL.SEL.6-8.3.A.3a - Evaluate how honesty, respect, fairness, and compassion enable one to take the needs of others into account when making decisions. IL.SEL.6-8.3.B.3a - Analyze how decision-making skills improve study habits and academic performance.		

December

Grade 8 Science Engineering Design

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language
Define - Attend to precision of criteria and constraints and considerations likely to limit possible solutions. Develop Solutions - Combine parts of different solutions to create new solutions. Optimize - Use systematic processes to test and refine a solution.	Can a vehicle be powered by the energy of a mousetrap? How can a mousetrap vehicle be designed for distance versus speed? What are the factors that affect the force of friction? How does the size of the force affect the motion of the object?	RST.6-8.1 - Cite specific textual evidence to support analysis of science and technical texts. RST.6-8.3 - Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. RST.6-8.4 - Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics. RST.6-8.6 - Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text. RST.6-8.7 - Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). RST.6-8.8 - Distinguish among facts,	Identify and describe forces acting upon the vehicle Accurately measure and calculate	Friction Constraint Criteria Speed Force Mass Power Work Acceleration

			reasoned judgment based on research findings, and speculation in a text. RST.6-8.9 - Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. IL.SEL.6-8.2.A.3a - Predict others' feelings and perspectives in a variety of situations. IL.SEL.6-8.2.A.3b - Analyze how one's behavior may affect others. IL.SEL.6-8.2.C.3a - Analyze ways to establish positive relationships with others. IL.SEL.6-8.2.C.3b - Demonstrate cooperation and teamwork to promote group effectiveness. IL.SEL.6-8.3.A.3a - Evaluate how honesty, respect, fairness, and compassion enable one to take the needs of others into account when making decisions. IL.SEL.6-8.3.B.3a - Analyze how decision-making skills improve study habits and academic performance. 6-8.SEP.1.A - Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify and/or seek additional information. 6-8.SEP.1.C - Ask questions to determine relationships between independent and dependent variables and relationships in models. 6-8.SEP.1.D - Ask questions to clarify and/or refine a model, an explanation, or an engineering problem.		

January

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language

February

Grade 8 Science Energy

• The role of the mass of the object must be qualitatively counted for in any change of motion due to the application of a force.
• Newton's 2nd Law (F=MA) and the conservation of momentum can be used to predict changes in the motion of macroscopic objects.

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language
• For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite	• What makes an object move? • Why is energy necessary to do work?	MS-PS2.1 - Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.* MS-PS2.2 - Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of	Discuss how forces affect motion. Explain how energy can be converted from one form to another.	- acceleration - balanced force - compound machine - energy - energy conversion - force - fossil fuels

	direction. • The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change. The greater the mass of an object, the greater the force needed to achieve the same change in motion. For any given object, a larger force cause a larger change in motion. • Electric and magnetic forces can be attractive or repulsive, and their sizes depend on the magnitudes of the changes, currents, or magnetic strengths involved and on the distances between interacting objects. • Forces that act at a distance (electric, magnetic, and gravitational) can be explained by fields that extend through space and can be mapped by their effect on a test object (A charged object or a ball, respectively).	• How is energy transferred?	the object. MS-PS3.1 - Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. MS-PS3.2 - Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. MS-PS3.5 - Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. MS-PS4.2 - Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. RST.6-8.1 - Cite specific textual evidence to support analysis of science and technical texts. RST.6-8.3 - Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. RST.6-8.4 - Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics. RST.6-8.6 - Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text. RST.6-8.7 - Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). RST.6-8.8 - Distinguish among facts, reasoned judgment based on research findings, and speculation in a text. RST.6-8.9 - Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. MS-PS3.3 - Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.* MS-PS3.4 - Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the	Understand how machines increase our ability to work. Analyze the economic, environmental, political and social issues surrounding an environmental problem. Predict and discuss factors that influence the relative motion of an object. Create a proposal for a design investigation and conduct a technological design test. Demonstrate how forces affect motion. Conduct experiments with manipulated and responding variables. Apply principles of forces and motion to design technology.	- free fall - friction - inclined plane - inertia - joule - lever - machine - Mechanical Advantage - Mechanical Efficiency - momentum - motion - net force - nonrenewable energy source - power - pulley - reference point - renewable energy source - screw - speed - simple machine - speed - terminal velocity - unbalanced force - velocity - watt - wedge - wheel and axle - work input - work output

			sample. RST.6-8.5 - Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic. IL.SEL.6-8.2.A.3a - Predict others' feelings and perspectives in a variety of situations. IL.SEL.6-8.2.A.3b - Analyze how one's behavior may affect others. IL.SEL.6-8.2.C.3a - Analyze ways to establish positive relationships with others. IL.SEL.6-8.2.C.3b - Demonstrate cooperation and teamwork to promote group effectiveness. IL.SEL.6-8.3.A.3a - Evaluate how honesty, respect, fairness, and compassion enable one to take the needs of others into account when making decisions. IL.SEL.6-8.3.B.3a - Analyze how decision-making skills improve study habits and academic performance. G6-8:1.18 - Use Web browsing to access information (e.g., enter a URL, access links, create bookmarks/favorites, print Web pages). G6-8:3.1 - Explain and demonstrate effective searching and browsing strategies when working on projects. G6-8:3.4 - Independently use appropriate technology tools (e.g., graphic organizer) to define problems and propose hypotheses. G6-8:3.9 - Use a variety of telecommunication tools (e.g., e-mail, discussion groups, Web pages, blogs, Web conferences) to collaborate and communicate with peers, experts, and other audiences (at district's discretion).		

March

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language

April

Grade 8 Science Electricity & Magnetism

• Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects.

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language
Electricity is a form of energy that can be	How do electrially charged objects	MS-PS2.3 - Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.	Investigate the differences between	- attract - charge

	transformed by moving electric chrages doing work in various devices. Electric fields provide the force that moves charged particles. A potential difference has to be maintained in order to move charges between two points. Magnetic fields are produced around moving charges. A changing magnetic field can induce a current in a closed conductor.	interact? How can objects become electrically charged? What is an electric discharge? What is the relationship between electric charge and electric current? What are voltage, current, and resistance? How do they affect each other? What are the basic parts of an electric circuit? How do the two types of electric circuits differ? What types of forces do magnets apply to other magnets? Why are some materials magnetic? Why are some magnets temporary and others permanent? Why does a magnet apply a force on an electric current? How do electromagnets and permanent magnets differ? How do electric motors use magnets? How can a wire and a magnet produce an electric current? How do electric generators create an electric current? How are transformers used to bring an electric current into your home?	MS-PS2.4 - Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. MS-PS2.5 - Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact. RST.6-8.1 - Cite specific textual evidence to support analysis of science and technical texts. RST.6-8.3 - Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. RST.6-8.4 - Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics. RST.6-8.6 - Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text. RST.6-8.7 - Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). RST.6-8.8 - Distinguish among facts, reasoned judgment based on research findings, and speculation in a text. RST.6-8.9 - Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. IL.SEL.6-8.2.A.3a - Predict others' feelings and perspectives in a variety of situations. IL.SEL.6-8.2.A.3b - Analyze how one's behavior may affect others. IL.SEL.6-8.2.C.3a - Analyze ways to establish positive relationships with others. IL.SEL.6-8.2.C.3b - Demonstrate cooperation and teamwork to promote group effectiveness. IL.SEL.6-8.3.A.3a - Evaluate how honesty, respect, fairness, and compassion enable one to take the needs of others into account when making decisions. IL.SEL.6-8.3.B.3a - Analyze how decision-making skills improve study	parallel and series circuits. Explain the relationship between magnets and electric circuits. Identify and describe the three major parts of all electric circuits. Explain how a magnetic field exerts a force on electrically charged particles and in an electric current.	- current - electricity - electromagentic - magnetic - magnitude - repulse

			habits and academic performance.		

May

Grade 8 Science Human Brain • Each sensor receptor responds to different inputs, transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behavior or memories.

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language
• Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories.	• How do we improve our memory? • How do we perceive color and light? • How does the structure of our eye affect how we perceive the world we live in?	MS-LS1.8 - Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. RST.6-8.1 - Cite specific textual evidence to support analysis of science and technical texts. RST.6-8.3 - Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. RST.6-8.7 - Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). RST.6-8.9 - Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. IL.SEL.6-8.2.A.3a - Predict others' feelings and perspectives in a variety of situations. IL.SEL.6-8.2.A.3b - Analyze how one's behavior may affect others. IL.SEL.6-8.2.C.3a - Analyze ways to establish positive relationships with others. IL.SEL.6-8.2.C.3b - Demonstrate cooperation and teamwork to promote group effectiveness. IL.SEL.6-8.3.A.3a - Evaluate how honesty, respect, fairness, and compassion enable one to take the needs of others into account when making decisions. IL.SEL.6-8.3.B.3a - Analyze how decision-making skills improve study habits and academic performance.	Learn and identify the structure and function of the eye. - Explain how humans see. Investigate the structure and function of sensory systems through eye dissection. Invesitage how humans see.	- aqueous humor - brain - ciliary muscles - concave - convex - cornea - eye - fovea - iris - learning - lens - light - memory - optic nerve - photoreceptors (rods/cones) - pupil - retina - sclera - tapetum - vitreous humor

June

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language

July

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language