

Unit 1
Solutions

Duration	4 weeks	Assessed	
Priority Standard(s)	1.1.B	Properties of mixtures depend upon the concentrations, properties, and interactions of particles	
	1.1.D	Physical changes in states of matter due to thermal changes in materials can be explained by the Kinetic Theory of Matter	
	5.1.B	The hydrosphere is composed of water (a material with unique properties) and other materials	
Supporting Standard(s)	1.1.B.a	Classify solutions as either dilute or concentrated; as either saturated, unsaturated, or supersaturated	
	1.1.B.c	Predict the effects of solvent and solute polarity on solubility ("like dissolves like"); and predict the effects of temperature, surface area, particle size, and agitation on rates of solubility	
	1.1.D.c	Predict the effect of thermal changes on the properties (e.g., temperature, density) of a material (solids, liquids, gases)	
	9-12.PS1.A.3	Plan and conduct an investigation to gather evidence to compare physical and chemical properties of substances such as melting point, boiling point, vapor pressure, surface tension, and chemical reactivity to infer the relative strength of attractive forces between particles.	
	9-12.ESS2.C.1	Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.	
	5.1.B.a	Recognize the importance of water as a solvent in the environment as it relates to acid rain and water pollution	

Unit 2

Acids, Bases, and Salts

Duration	4 weeks			Assessed
Priority Standard(s)	1.1.B	Properties of mixtures depend upon the concentrations, properties, and interactions of particles		
	1.1.H	Chemical bonding is the combining of different pure substances (elements, compounds) to form new substances with different properties		
	5.1.B	The hydrosphere is composed of water (a material with unique properties) and other materials		
Supporting Standard(s)	1.1.B.b	Compare and contrast the properties of acidic, basic, and neutral solutions.		
	1.1.H.d	Predict the products of an acid/base (neutralization), oxidation (rusting), and combustion (burning) reaction		
	5.1.B.	Recognize the importance of water as a solvent in the environment as it relates to acid rain and water pollution		

Unit 3

Gas Laws

Duration	4 weeks	Assessed	
Priority Standard(s)	1.1.D	Physical changes in states of matter due to thermal changes in materials can be explained by the Kinetic Theory of Matter	
	1.2.B	Mechanical energy comes from the motion (kinetic energy) and/or relative position (potential energy) of an object	
	5.1.C	The atmosphere (air) is composed of a mixture of gases, including water vapor, and minute particles	
Supporting Standard(s)	1.1.D.a	Using the Kinetic Theory model, explain the changes that occur in the distance between atoms/molecules and a temperature of a substance as energy is absorbed or released during a phase change	
	1.1.D.b	Predict the effect of temperature changes on the properties (e.g., pressure, density) of a material (solids, liquids, gases)	
	1.1.D.c	Predict the effect of pressure changes on the properties (e.g., pressure, density) of a material (solids, liquids, gases)	
	1.2.B.a	Relate kinetic energy to an object's mass and it's velocity	
	5.1.C.a	Relate the composition of gases and temperature of the layers of the atmosphere to cloud formation and transmission of radiation	

Unit 4

Thermochemistry

Duration	4 weeks	Assessed	
Priority Standard(s)	1.2.A	Forms of energy have a source, a means of transfer (work and heat), and a receiver	
	1.2.D	Chemical reactions involve changes in the bonding of atoms with the release or absorption of energy	
	1.2.F	Energy can be transferred within a system as the total amount of energy remains constant (i.e., Law of Conservation of Energy)	
Supporting Standard(s)	9-12.PS1.A.4	Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy	
	9-12.PS3.B.1	Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics)	
	1.2.A.a	Differentiate between thermal energy (the total internal energy of a substance which is dependent upon mass), heat (thermal energy that transfers from one object or system to another due to a difference in temperature), and temperature (the measure of average kinetic energy of molecules or atoms in a substance)	
	1.2.A.c	Describe sources and common uses of different forms of energy: Chemical (the energy stored in the electrical fields between atoms in a compound), nuclear, thermal, mechanical, and electromagnetic	
	1.2.D.a	Describe evidence of energy transfer and transformations that occur during exothermic and endothermic chemical reactions	
	1.2.F.a	Classify the different ways to store energy (i.e., chemical, nuclear, thermal, mechanical, electromagnetic) and describe the transfer of energy as it changes from kinetic to potential, while the total amount of energy remains constant, within a system (e.g., using gasoline to move a car, photocell generating electricity, biochemical reaction, energy generated by nuclear reactor)	

Unit 5

Equilibrium and Rates of Reactions

Duration	4 weeks	Assessed	
Priority Standard(s)	1.1.D	Physical changes in states of matter due to thermal changes in materials can be explained by the Kinetic Theory of Matter	
	1.1.H	Chemical bonding is the combining of different pure substances (elements, compounds) to form new substances with different properties	
	1.1.I	Mass is conserved during any physical or chemical change	
	1.2.A	Forms of energy have a source, a means of transfer (work and heat), and a receiver	
Supporting Standard(s)	9-12.PS1.B.1	Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reaction particles on the rate at which a reaction occurs	
	9-12.PS1.B.2	Refine the design of a chemical system by specifying a change in conditions that would alter the amount of products at equilibrium	
	1.1.D.c	Predict the effect of pressure changes on the properties (e.g., pressure, density) of a material (solids, liquids, gases)	
	1.1.H.b	Predict the reaction rates of different substances based on their properties (i.e., concentrations of reactants, pressure, temperature state of matter, surface area, type of reactant material)	
	1.1.I.a	Compare the mass of the reactants to the mass of the products in a chemical reaction or physical change as support for the Law of Conservation of Mass	
	1.1.I.b	Recognize whether the number of atoms of the reactants and products in a chemical equation are balanced	
	1.2.A.c	Describe sources and common uses of different forms of energy: Chemical (the energy stored in the electrical fields between atoms in a compound), nuclear, thermal, mechanical, and electromagnetic	

Unit 6

Reduction-Oxidation

Duration	4 weeks			Assessed
Priority Standard(s)	1.1.F	The periodic table organizes the elements according to their atomic structure and chemical reactivity		
	1.1.H	Chemical bonding is the combining of different pure substances (elements, compounds) to form new substances with different properties		
	1.1.I	Mass is conserved during any physical or chemical change		
Supporting Standard(s)	1.1.F.c	Predict the chemical reactivity of elements, and the type of bonds that may result between them, using the Periodic Table		
	1.1.H.d	Predict the products of an acid/base (neutralization), oxidation (rusting), and combustion (burning) reaction		
	1.1.I.a	Compare the mass of the reactants to the mass of the products in a chemical reaction or physical change as support for the Law of Conservation of Mass		
	1.1.I.b	Recognize whether the number of atoms of the reactants and products in a chemical equation are balanced		

Unit 7

Electrochemistry

Duration	4 weeks	Assessed	
Priority Standard(s)	1.2.A	Forms of energy have a source, a means of transfer (work and heat), and a receiver	
	1.2.F	Energy can be transferred within a system as the total amount of energy remains constant (i.e., Law of Conservation of Energy)	
	5.1.C	The atmosphere (air) is composed of a mixture of gases, including water vapor, and minute particles	
Supporting Standard(s)	1.2.A.c	Describe sources and common uses of different forms of energy: Chemical (the energy stored in the electrical fields between atoms in a compound), nuclear, thermal, mechanical, and electromagnetic	
	1.2.F.a	Classify the different ways to store energy (i.e., chemical, nuclear, thermal, mechanical, electromagnetic) and describe the transfer of energy as it changes from kinetic to potential, while the total amount of energy remains constant, within a system (e.g., using gasoline to move a car, photocell generating electricity, biochemical reaction, energy generated by nuclear reactor)	
	5.1.C.b	Describe the causes and consequences of observed and predicted changes in the ozone layer	

Unit 8

Nuclear Chemistry

Duration	4 weeks	Assessed	
Priority Standard(s)	1.1.F	The periodic table organizes the elements according to their atomic structure and chemical reactivity	
	1.1.I	Mass is conserved during any physical or chemical change	
	1.2.E	Nuclear energy is a major source of energy throughout the universe	
	1.2.F	Energy can be transferred within a system as the total amount of energy remains constant (i.e., Law of Conservation of Energy)	
Supporting Standard(s)	9-12.PS1.C	Use symbolic representations to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.	
	9-12.ESS1.A	Develop a model based on evidence to illustrate the lifespan of the sun and the role of nuclear fusion in the Sun's core to release energy in the form of radiation	
	9-12.ESS1.A	Communicate scientific ideas about the way stars, over their life cycle, produce elements.	
	1.1.F.c	Predict the chemical reactivity of elements, and the type of bonds that may result between them, using the Periodic Table	
	1.1.I.a	Compare the mass of the reactants to the mass of the products in a chemical reaction or physical change as support for the Law of Conservation of Mass	
	1.1.I.b	Recognize whether the number of atoms of the reactants and products in a chemical equation are balanced	
	1.2.E.a	Describe how changes in the nucleus of an atom during a nuclear reaction (i.e., nuclear decay, fusion, fission) result in emission of radiation	
	1.2.F.a	Classify the different ways to store energy (i.e., chemical, nuclear, thermal, mechanical, electromagnetic) and describe the transfer of energy as it changes from kinetic to potential, while the total amount of energy remains constant, within a system (e.g., using gasoline to move a car, photocell generating electricity, biochemical reaction, energy generated by nuclear reactor)	

Unit 9

Organic Chemistry

Duration	4 weeks	Assessed	
Priority Standard(s)	1.1.H	Chemical bonding is the combining of different pure substances (elements, compounds) to form new substances with different properties	
	1.2.A	Forms of energy have a source, a means of transfer (work and heat), and a receiver	
Supporting Standard(s)	9-12.LS1.C.3	Construct and revise an explanation based on evidence that organic macromolecules are primarily composed of six elements, where carbon, hydrogen, and oxygen atoms may combine with nitrogen, sulfur, and phosphorus to form large carbon-based molecules	
	1.1.H.a	Describe how the valence electrons configuration determines how atoms interact and may bond	
	1.1.H.b	Predict the reaction rates of different substances based on their properties (i.e., concentrations of reactants, pressure, temperature state of matter, surface area, type of reactant material)	
	1.2.A.c	Describe sources and common uses of different forms of energy: Chemical (the energy stored in the electrical fields between atoms in a compound), nuclear, thermal, mechanical, and electromagnetic	