

IAA Curriculum

Content Area	Science	Grade	8
Course Name	Life Science		

Unit/Concepts	Unit 1: Cells to Organisms					
Key Learning Objectives & Skills	<ul style="list-style-type: none"> Analyze data from labs Model cell structures Analyze models Identify structures Identify key vocabulary Formulate answers to analysis questions Formulate predictions Classify levels of organization Identify plant cell structures Identify animal cell structures 					
Big Ideas & Competencies	<p>Themes and connections between the Standards that help students to see the purpose and relevance of content.</p> <ul style="list-style-type: none"> Levels of organization Animal and plant cell structure and function Cell theory Cells and disease Multicellular organisms have several levels of structure- levels of organization A cell carries out many of the same functions as are carried out at the organism level Plants have important structures that are not found in animal cells The cell theory is based on the finding that all living things are composed of cells Disease is a breakdown in the structure or function of an organism 					
Essential Questions	<p>Statements summarizing important ideas and core processes that are central to the unit or concept and have lasting value beyond the classroom.</p> <ul style="list-style-type: none"> How do scientists figure out the source of an infectious disease outbreak? What can cause an infectious disease? How can tools such as microscopes help scientists provide evidence about living organisms? How did the Cell Theory lead to the germ theory of disease? What evidence can you gather that cells are alive? How do the structures in animal and plant cells relate to their functions? What is the function of a cell membrane? How do the parts of a cell work together? How do the cells of multicellular organisms compare with the cells of single-celled organisms? What structures in plant cells convert energy from the sun into energy stored in food? 					
Dates (estimates only)	Smart Objectives	Instructional Strategies and Activities	PA CC Standards	Keystone or PSSA Anchors	Keystone / PSSA Eligible	Vocabulary

					Content	
5 weeks	<p>What do students have to do related to the content?</p> <p>Levels of Organization</p> <ul style="list-style-type: none"> Identify the levels of organization in order Identify the functions that a cell carries out Relate cell functions with sustaining life Categorize levels of organization <p>Animal Cell</p> <ul style="list-style-type: none"> Identify the components of an animal cell Evaluate the functions of each cell structure Draw an animal cell <p>Plant Cell</p> <ul style="list-style-type: none"> Evaluate the functions of each cell structure Compare and contrast the structures of plant and animal cells Draw a plant cell <p>Cell Theory</p> <ul style="list-style-type: none"> Identify the main ideas of the cell theory and who developed it Draw a cell and its structures Assess the progression of knowledge that formed the cell theory <p>Disease</p> <ul style="list-style-type: none"> Identify that disease is a breakdown in the structure or function of an organism Connect the cell theory and theory of disease Predict knowledge of disease in the future 	<p>Used to develop the skills and knowledge</p> <p>Levels of Organization</p> <ul style="list-style-type: none"> Lab based learning Modeling systems Reading scientific procedures Keeping a science notebook Constructing a concept map Developing communication skills Answering analysis questions based on lab activities Graph the levels of organization Discuss bodily functions and how they relate to levels of organization <p>Animal Cell</p> <ul style="list-style-type: none"> Lab based learning Modeling systems Reading scientific procedures Keeping a science notebook Constructing a concept map Developing communication skills Answering analysis questions based on lab activities Draw and label animal cells Relate animal cell structures to their functions Relate structures to common life ideas (factory, city) <p>Plant Cell</p> <ul style="list-style-type: none"> Lab based learning Modeling systems Reading scientific procedures Keeping a science notebook Constructing a concept map Developing communication skills Answering analysis questions based on lab activities Draw and label plant cells Discuss differences of plant 	<p>CC.3.6.6-8.A. CC.3.6.6-8.C CC.3.6.6-8.E CC.3.6.6-8.H CC.3.5.6-8.C CC.3.5.6-8.E CC.3.5.6-8.H CC.3.5.6-8.I CC.3.5.6-8.J CC.3.6.6-8.D. CC.3.6.6-8.G 3.1.8.A8 3.1.8.A9 3.1.8.C1 3.1.8.C4</p>	<p>S8.A.2.2 S8.A.2.1 S8.A.3.1</p>	<p>S8.A.1.3.2 S8.A.1.3.3 S8.A.1.3.4 S8.A.2.1.4 S8.A.2.2.3 S8.A.3.1.1 S8.A.3.1.2 S8.A.3.1.3</p>	<p>What is the essential vocabulary of the unit or concept?</p> <p>Cell Cell Theory Cellular respiration Energy Infectious disease Organelle Levels of organization Matter Multicellular Nucleus Photosynthesis Unicellular</p>

		<p>and animal cells and why those differences exist</p> <ul style="list-style-type: none"> ● Relate plant cell structures to their functions <p>Cell Theory</p> <ul style="list-style-type: none"> ● Lab based learning ● Modeling systems ● Reading scientific procedures ● Keeping a science notebook ● Constructing a concept map ● Developing communication skills ● Answering analysis questions based on lab activities ● Discuss scientist thoughts throughout time on cell theory <p>Disease</p> <ul style="list-style-type: none"> ● Lab based learning ● Modeling systems ● Reading scientific procedures ● Keeping a science notebook ● Constructing a concept map ● Developing communication skills ● Answering analysis questions based on lab activities ● Debate cause and effect of different disease outbreaks 				
Resources	<p>Materials, texts, videos, internet sites, software, human to support instruction</p> <ul style="list-style-type: none"> ● SEPUP-Lab aids textbook <ul style="list-style-type: none"> ○ Lab activities ○ Videos ● Materials to model content 					
Formative Assessments	<p>What evidence (product and/or performance) will be collected to establish that content and skills are being learned?</p> <ul style="list-style-type: none"> ● Exit tickets ● Lab reports ● Models ● Quiz ● Do now ● Discussion ● Stations ● Oral questioning ● Independent practice 					

Summative Assessments	<p>What evidence (produce and/or performance) will be collected to determine that content and skills have been learned?</p> <ul style="list-style-type: none"> ● Unit Test ● Project
Strategies for ELL and IEP Support	<p>What tools, strategies, and resources will be used to provide accommodations and modifications to support students?</p> <ul style="list-style-type: none"> ● Productive pacing ● Incorporate native languages ● Use visuals ● Small group teaching ● Provide different levels of materials ● Simplify language ● Repetition ● Provide content in multiple forms
Acceleration Strategies	<p>What tools, strategies, and resources will be used to help advance students closer to grade-level expectations</p> <ul style="list-style-type: none"> ● Scaffolding of material ● Collaboration with others ● Grouping of students ● Concrete examples ● Visuals ● Integrate technology ● Goal setting

IAA Curriculum

Content Area	Science	Grade	8th Grade
Course Name	Life Science		

Unit 2/ Concepts	Unit 2: Reproduction
Big Ideas	<ul style="list-style-type: none"> • Heredity and genes • Sexual and asexual reproduction • Diversity in offspring • Inheritance of traits • Offspring inherit characteristics, such as eye color or height, from their parents • A single organism can reproduce through asexual reproduction • When the genes of a cell are reproduced, occasionally there are random changes to the DNA, called mutations • In sexually reproducing organisms, the sperm and egg have only one of each kind of chromosomes • The trait produced by an allele can be dominant or recessive • The genotype of an organism is the combination of alleles that the organism has • The phenotype is the physical appearance or other characteristics produced by the genes
Key Learning Objectives & Skills	<ul style="list-style-type: none"> • Analyze data from labs • Model cell structures • Analyze models • Identify structures • Identify key vocabulary • Formulate answers to analysis questions • Formulate predictions • Identify reproduction process on cellular level • Differentiate genotype and phenotype • Identify asexual and sexual reproduction • Graph changes in populations • Analyze diversity in offspring
Essential Questions	<p>Statements summarizing important ideas and core processes that are central to the unit or concept and have lasting value beyond the classroom.</p> <ul style="list-style-type: none"> • What do cells have to do with sexual and asexual reproduction? • What happens when two parents with different traits have offspring? • How can we model and predict the ratios of traits observed in the offspring of parents with two versions of a trait? • What causes the patterns that can be observed when two parents with different traits have offspring? • What causes the differences between genetically identical organisms? • How do sex cells transmit genetic information for determining traits to their offspring? • What causes variation between offspring of the same parents? • How does a gene produce a trait?

Dates (estimates only)	Smart Objectives	Instructional Strategies and Activities	PA CC Standards	Keystone or PSSA Anchors	Keystone / PSSA Eligible Content	Vocabulary
(4 weeks)	<p>What do students have to do related to the content?</p> <p>Heredity and Genes</p> <ul style="list-style-type: none"> • Compare the differences of phenotype and genotype • Identify dominant and recessive traits • Describe what happens on the cellular level when organisms reproduce <p>Sexual Reproduction</p> <ul style="list-style-type: none"> • Describe what happens on the cellular level during sexual reproduction • Label the phases of sexual reproduction • Identify each phase of Mitosis/Meiosis <p>Asexual Reproduction</p> <ul style="list-style-type: none"> • Identify how a single organism can reproduce • Label the phases of asexual reproduction • Compare asexual and sexual reproduction <p>Diversity in Offspring</p> <ul style="list-style-type: none"> • Identify genetic diversity and variation • Graph diversity in different locations • Draw conclusions about causes of diversity <p>Inheritance</p> <ul style="list-style-type: none"> • Compare the differences of phenotype and genotype • Identify how offspring inherit characteristics • Graph affects over time of genetic diseases 	<p>Used to develop the skills and knowledge</p> <p>Heredity and Genes</p> <ul style="list-style-type: none"> • Lab based learning • Modeling systems • Reading scientific procedures • Keeping a science notebook • Constructing a concept map • Developing communication skills • Answering analysis questions based on lab activities (4 sentences) • Provide examples of phenotypes and genotypes • Reproductive cell simulations • Observing under the microscope <p>Sexual Reproduction</p> <ul style="list-style-type: none"> • Lab based learning • Modeling systems • Reading scientific procedures • Keeping a science notebook • Constructing a concept map • Developing communication skills • Answering analysis questions based on lab activities (4 sentences) • Cell reproduction videos • Mitosis/ Meiosis Simulations <p>Asexual Reproduction</p> <ul style="list-style-type: none"> • Lab based learning • Modeling systems • Reading scientific procedures • Keeping a science notebook • Constructing a concept map • Developing communication skills • Answering analysis questions based on lab activities (4 sentences) 	<p>CC.3.6.6-8.A. CC.3.6.6-8.C CC.3.6.6-8.E CC.3.6.6-8.H CC.3.5.6-8.A CC.3.5.6-8.C CC.3.5.6-8.E CC.3.5.6-8.H CC.3.5.6-8.I. CC.3.5.6-8.J 3.1.8.A8 3.1.8.A9 3.1.8.C1 3.1.8.C4</p>	<p>S8.A.1.1 S8.A.1.2</p>	<p>S8.A.1.3.1 S8.A.1.3.2 S8.A.1.3.3 S8.A.1.3.4</p>	<p>What is the essential vocabulary of the unit or concept?</p> <p>Asexual reproduction Sexual reproduction Characteristic Chromosome Fertilization Gene Genetic diversity Heredity Inherited Mutation Reproductive success Trait</p>

		<ul style="list-style-type: none"> • Single celled reproduction simulation <p>Diversity in Offspring</p> <ul style="list-style-type: none"> • Lab based learning • Modeling systems • Reading scientific procedures • Keeping a science notebook • Constructing a concept map • Developing communication skills • Answering analysis questions based on lab activities (4 sentences) • Graphing in excel • Analyzing graphing data • Practice Punnett Squares • Finding patterns of diversity <p>Inheritance</p> <ul style="list-style-type: none"> • Lab based learning • Modeling systems • Reading scientific procedures • Keeping a science notebook • Constructing a concept map • Developing communication skills • Answering analysis questions based on lab activities (4 sentences) • Practice Punnett Squares • Graphing on paper and excel 				
Resources	<p>Materials, texts, videos, internet sites, software, human to support instruction</p> <ul style="list-style-type: none"> • SEPUP-Lab aids textbook <ul style="list-style-type: none"> ◦ Lab activities ◦ Videos • Materials to model content 					
Formative Assessments	<p>What evidence (product and/or performance) will be collected to establish that content and skills are being learned?</p> <ul style="list-style-type: none"> • Exit tickets • Lab reports • Models • Quiz • Do now • Discussion • Stations 					

	<ul style="list-style-type: none"> • Oral questioning • Independent practice
Summative Assessments	<p>What evidence (produce and/or performance) will be collected to determine that content and skills have been learned?</p> <ul style="list-style-type: none"> • Unit Test • Project
Strategies for ELL and IEP Support	<p>What tools, strategies, and resources will be used to provide accommodations and modifications to support students?</p> <ul style="list-style-type: none"> • Productive pacing • Incorporate native languages • Use visuals • Small group teaching • Provide different levels of materials • Simplify language • Repetition • Provide content in multiple forms
Acceleration Strategies	<p>What tools, strategies, and resources will be used to help advance students closer to grade-level expectations</p> <ul style="list-style-type: none"> • Scaffolding of material • Collaboration with others • Grouping of students • Concrete examples • Visuals • Integrate technology • Goal setting

Content Area	Science	Grade	8th
Course Name	Life Science		

Unit 3/ concepts	Unit 3: Force and Motion
Big Ideas	<p>Themes and connections between the Standards that help students to see the purpose and relevance of content.</p> <ul style="list-style-type: none"> ● Speed and Motion ● Speed is the distance an object travels in a certain amount of time. ● Kinetic Energy ● All moving objects have kinetic energy. Kinetic energy can be quantified and measured in joules (J). ● Balanced and Unbalanced Forces ● A force is any push or pull acting on an object. Force is measured in the unit called the newton (N). ● Newton's Laws of Motion ● Newton's first law, also known as the law of inertia, states that an object's motion cannot change unless a force acts on the object. ● Car and Driver Safety ● Newton's laws have been applied in the rules that influence driver behavior, such as speed limit laws, and in the design of motor vehicles.
Key Learning Objectives & Skills	<ul style="list-style-type: none"> ● Analyze data from labs ● Model systems ● Analyze models ● Identify functions ● Identify key vocabulary ● Formulate answers to analysis questions ● Formulate predictions ● Identify balanced and unbalanced forces ● Summarize Newton's Law of Motion
Essential Questions	<p>Statements summarizing important ideas and core processes that are central to the unit or concept and have lasting value beyond the classroom.</p> <ul style="list-style-type: none"> ● How do you decide which vehicle is safer? ● How can you measure and graph the speed of a moving object? ● What is the relationship between an object's speed and its kinetic energy? ● How does the mass of a car affect its kinetic energy? ● What is the mathematical relationship between kinetic energy and speed of an object, and between kinetic energy and mass of an object? ● What causes an object to change direction? ● What causes an object to change speed? ● What is the mathematical relationship between force, acceleration, and mass? ● What relationships between force and motion did Newton discover? ● What happens when objects interact? ● What additional relationship between force and motion did Newton discover? ● How can the motion of interacting objects change due to a collision? ● What are the effects of speed and mass on braking distance? ● How does a vehicle's stopping distance change in different situations?

	<ul style="list-style-type: none"> How can you design a system to help drivers keep a safe distance behind another car in different situations? How do force and mass affect the change in an object's motion? How do we prove that gravitational forces are attractive and depend on the mass of the interacting objects? What forces exist between objects, even when the objects are not in contact? 					
Dates (estimates only)	Smart Objectives	Instructional Strategies and Activities	PA CC Standards	Keystone or PSSA Anchors	Keystone / PSSA Eligible Content	Vocabulary
(5 weeks)	What do students have to do related to the content?	Used to develop the skills and knowledge				What is the essential vocabulary of the unit or concept?
	<p>Speed and Motion</p> <ul style="list-style-type: none"> Describe how speed is the distance an object travels in a certain amount of time by using the formula $\text{speed} = \text{distance} / \text{time}$ Infer how all moving objects have kinetic energy and kinetic energy can be quantified and measured in joules (J) Identify how a force is any push or pull acting on an object. Force is measured in the unit called the newton (N) <p>Newton's Law of Motion</p> <ul style="list-style-type: none"> Categorize Newton's first law, also known as the law of inertia, which states that an object's motion cannot change unless a force acts on the object Infer that Newton's laws have been applied in the rules that influence driver behavior, such as speed limit laws, and in the design of motor vehicles Describe Newton's Laws and explain how changes in motion require a force. <p>Kinetic Energy</p>	<p>Speed and Motion</p> <ul style="list-style-type: none"> Lab based learning Modeling systems Reading scientific procedures Keeping a science notebook Constructing a concept map Developing communication skills Answering analysis questions based on lab activities Use materials to model speed Calculate speed Identify symbols for formulas <p>Newton's Law of Motion</p> <ul style="list-style-type: none"> Lab based learning Modeling systems Reading scientific procedures Keeping a science notebook Constructing a concept map Developing communication skills Answering analysis questions based on lab activities Calculate using formulas Model Newton's laws Draw examples of Newton's laws Venn Diagram to compare Newton's laws <p>Kinetic Energy</p> <ul style="list-style-type: none"> Lab based learning Modeling systems Reading scientific procedures 	<p>CC.3.6.6-8.A. CC.3.6.6-8.C CC.3.6.6-8.E CC.3.6.6-8.H CC.3.5.6-8.A CC.3.5.6-8.C CC.3.5.6-8.E CC.3.5.6-8.H CC.3.5.6-8.I CC.3.5.6-8.J 3.2.8.A1 3.2.8.A2 3.2.8.A3 3.2.8.A6 3.2.8.B1 3.2.8.B3 3.3.8.B1</p>	<p>S8.A.1.1 S8.A.1.2 S8.C.3.1</p>	<p>S8.A.1.1.1 S8.A.1.2.3 S8.C.3.1.1 S8.C.3.1.2 S8.C.3.1.3</p>	<p>acceleration average speed balanced forces braking distance constraints criteria design direction engineer Force Friction Inertia kinetic energy mass net force -Newton's laws of motion reaction time Speed stopping distance system unbalanced forces</p>

	<ul style="list-style-type: none"> • Explain how inertia is a measure of an object's mass and provide evidence that it is the natural tendency of objects to resist changes in their state of motion. • Describe how momentum is related to the forces acting on an object and determine the velocity of the object. • Describe a closed system and explain the law of the conservation of momentum. • Apply Newton's Third Law and design a solution to a problem involving the motion of two colliding objects. <p>Balanced and Unbalanced Forces</p> <ul style="list-style-type: none"> • Formulate an investigation and provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. • Construct and present arguments using evidence and support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. • Conduct an investigation and evaluate the experimental design and provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact. 	<ul style="list-style-type: none"> • Keeping a science notebook • Constructing a concept map • Developing communication skills • Answering analysis questions based on lab activities • Model kinetic energy • Use classroom materials to model kinetic energy <p>Balanced and Unbalanced Forces</p> <ul style="list-style-type: none"> • Lab based learning • Modeling systems • Reading scientific procedures • Keeping a science notebook • Constructing a concept map • Developing communication skills • Answering analysis questions based on lab activities • Use classroom materials to model balanced and unbalanced forces • Investigate the differences of balanced and unbalanced forces 				
<p>Resources</p>	<p>Materials, texts, videos, internet sites, software, human to support instruction</p> <ul style="list-style-type: none"> • SEPUP-Lab aids textbook <ul style="list-style-type: none"> ○ Lab activities ○ Videos 					

	<ul style="list-style-type: none"> • Materials to model content •
Formative Assessments	<p>What evidence (product and/or performance) will be collected to establish that content and skills are being learned?</p> <ul style="list-style-type: none"> • Exit tickets • Lab reports • Models • Quiz • Do now • Discussion • Stations • Oral questioning • Independent practice
Summative Assessments	<p>What evidence (produce and/or performance) will be collected to determine that content and skills have been learned?</p> <ul style="list-style-type: none"> • Unit Test • Project
Strategies for ELL and IEP Support	<p>What tools, strategies, and resources will be used to provide accommodations and modifications to support students?</p> <ul style="list-style-type: none"> • Productive pacing • Incorporate native languages • Use visuals • Small group teaching • Provide different levels of materials • Simplify language • Repetition • Provide content in multiple forms
Acceleration Strategies	<p>What tools, strategies, and resources will be used to help advance students closer to grade-level expectations</p> <ul style="list-style-type: none"> • Scaffolding of material • Collaboration with others • Grouping of students • Concrete examples • Visuals • Integrate technology • Goal setting

Content Area	Science	Grade	8th
Course Name	Life Science		

Unit / Concepts	Unit 4: Fields and interactions					
Big Ideas	<p>Themes and connections between the Standards that help students to see the purpose and relevance of content.</p> <ul style="list-style-type: none"> • Engineering Design Process • Gravitational Force • Gravitational Fields • Magnetism • Magnetic Fields Electrostatic Charge • Electric Fields • Electromagnetism • Potential Energy in Fields • The engineering design process is a series of steps that all kinds of engineers follow to solve a problem, • Gravity is a phenomenon that we experience every day, • Since gravity is a force-at-a-distance, it can be explained by a gravitational field, • Magnetism is a phenomenon related to the material properties of objects • Magnetic fields surround and extend through magnetized objects. • Electric charges, which exist in atoms and molecules, can be either positive or negative. • Electric fields exist around charges and charged objects. • Electric fields and magnetic fields are actually a single combined phenomenon known as electromagnetism. • All fields store energy. 					
Key Learning Objectives & Skills	<ul style="list-style-type: none"> • Analyze data from labs • Model systems • Analyze models • Identify functions • Identify key vocabulary • Formulate answers to analysis questions • Formulate predictions • Interpret electric fields • Investigate potential energy in fields 					
Essential Questions	<p>Statements summarizing important ideas and core processes that are central to the unit or concept and have lasting value beyond the classroom.</p> <ul style="list-style-type: none"> • Why do magnets only affect some materials? • Do objects always fall to the ground because of gravity? • Are there other phenomena besides magnetism and gravity that are able to attract objects? • How does understanding scientific phenomena make it easier to design solutions to problems? 					
Dates (estimates only)	Smart Objectives	Instructional Strategies and Activities	PA CC Standards	Keystone or PSSA Anchors	Keystone / PSSA Eligible	Vocabulary

					Content	
(4 weeks)	What do students have to do related to the content?	Used to develop the skills and knowledge				What is the essential vocabulary of the unit or concept?
	<p>Electric Fields</p> <ul style="list-style-type: none"> Describe energy as a property of objects associated with heat, light, electricity, magnetism, mechanical motion, and sound. Distinguish how electric current produces magnetic forces and how moving magnets produce electric current. Interpret an investigation of voltage, current, and resistance in order to describe how current flows through a resistance. Investigate evidence that fields exist between objects exerting forces on each other even though the objects are not in contact. <p>Potential Energy in Fields</p> <ul style="list-style-type: none"> Distinguish that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. Distinguish 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 sample. Compare the motion of particles in solids, liquids, 	<p>Electric Fields</p> <ul style="list-style-type: none"> Lab based learning Modeling systems Reading scientific procedures Keeping a science notebook Constructing a concept map Developing communication skills Answering analysis questions based on lab activities Create electric currents Model electricity in effect Model electric currents producing magnetic forces <p>Potential Energy in Fields</p> <ul style="list-style-type: none"> Lab based learning Modeling systems Reading scientific procedures Keeping a science notebook Constructing a concept map Developing communication skills Answering analysis questions based on lab activities Model potential energy Draw potential energy examples Write various potential energy models from within the classroom <p>Magnetism</p> <ul style="list-style-type: none"> Lab based learning Modeling systems Reading scientific procedures Keeping a science notebook Constructing a concept map Developing communication skills Answering analysis questions based on lab activities 	CC.3.6.6-8.A. CC.3.6.6-8.C CC.3.6.6-8.E CC.3.6.6-8.H CC.3.5.6-8.A CC.3.5.6-8.C CC.3.5.6-8.E CC.3.5.6-8.H CC.3.5.6-8.I CC.3.5.6-8.J 3.3.8.B2 3.2.8.B6 3.2.8.B4 3.2.8.B1 3.3.8.B1 3.3.8.B2	S8.A.2.2 S8.A.1.1 S8.A.1.2 S8.C.3.1	S8.A.2.2.1 S8.A.2.2.2 S8.A.2.2.3 S8.A.1.1.1 S8.A.1.2.3 S8.C.3.1.1 S8.C.3.1.2 S8.C.3.1.3	Charge constraint criteria electric field electric force electromagnetism engineering design process force force-at-a-distan-ce gravitational field gravitational force gravitational potential energy gravity magnetic field magnetic force mass model optimize potential energy prototype

	<p>and gasses.</p> <ul style="list-style-type: none"> Classify how energy is transferred from one place to another through convection, conduction, or radiation. Infer how heat moves in predictable ways from warmer objects to cooler ones. <p>Magnetism</p> <ul style="list-style-type: none"> Identify the amount of gravitational force between objects. Identify how we can visualize a magnetic field. Distinguish the factors that affect the strength of a field. Interpret the effects of static electricity. Compare the amount and direction of electrostatic force. Distinguish how electric and electromagnetic fields work. 	<ul style="list-style-type: none"> Model magnetism within the classroom Draw examples of magnetism Write 3 examples of magnetism occurring Venn Diagram of magnetism and non magnetism situations 				
Resources	<p>Materials, texts, videos, internet sites, software, human to support instruction</p> <ul style="list-style-type: none"> SEPUP-Lab aids textbook <ul style="list-style-type: none"> Lab activities Videos Materials to model content 					
Formative Assessments	<p>What evidence (product and/or performance) will be collected to establish that content and skills are being learned?</p> <ul style="list-style-type: none"> Exit tickets Lab reports Models Quiz Do now Discussion Stations Oral questioning Independent practice 					
Summative Assessments	<p>What evidence (produce and/or performance) will be collected to determine that content and skills have been learned?</p> <ul style="list-style-type: none"> Unit Test 					

	<ul style="list-style-type: none"> • Project
Strategies for ELL and IEP Support	<p>What tools, strategies, and resources will be used to provide accommodations and modifications to support students?</p> <ul style="list-style-type: none"> • Productive pacing • Incorporate native languages • Use visuals • Small group teaching • Provide different levels of materials • Simplify language • Repetition • Provide content in multiple forms
Acceleration Strategies	<p>What tools, strategies, and resources will be used to help advance students closer to grade-level expectations</p> <ul style="list-style-type: none"> • Scaffolding of material • Collaboration with others • Grouping of students • Concrete examples • Visuals • Integrate technology • Goal setting

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Content Area	Science	Grade	8th Grade
Course Name	Life Science		

Unit/ Concepts	Unit 5: Earth Science (PSSA Preparation)					
Big Ideas	<ul style="list-style-type: none"> • Natural processes that change earth • How humans change earth • Earth's water • Weather and climate • Solar system • There are processes taking place right now that continuously change Earth • Earth's air, soil, and water are important resources necessary for organisms to live and grow • Water cycles back and forth between Earth's surface and its atmosphere over and over again • Weather is the condition of the atmosphere at a certain time and place • Climate is the average weather conditions of an area over a very long period of time • Earth is part of a solar system that consists of the sun, planets, and other celestial bodies that revolve around the sun 					
Key Learning Objectives & Skills	<ul style="list-style-type: none"> • Analyze models • Identify structures • Identify key vocabulary • Formulate answers to analysis questions • Model the solar system and water cycle • Infer changes in weather and climate • Find evidence of changes over geological time • Evaluate human effects on Earth 					
Essential Questions	<p>Statements summarizing important ideas and core processes that are central to the unit or concept and have lasting value beyond the classroom.</p> <ul style="list-style-type: none"> • Can a metamorphic rock become a new metamorphic rock? Explain. • What are two steps you can take to help reduce your impact on Earth's resources? • Why is the Sun important to the water cycle? • How are weather and climate alike and different? • Would there be day and night if Earth did not rotate? 					
Dates (estimates only)	Smart Objectives	Instructional Strategies and Activities	PA CC Standards	Keystone or PSSA Anchors	Keystone / PSSA Eligible Content	Vocabulary
(2 weeks)	What do students have to do related to the content? Natural processes that change earth	Used to develop the skills and knowledge Natural processes that change earth <ul style="list-style-type: none"> • Developing communication 	CC.3.6.6-8.A. CC.3.6.6-8.C CC.3.6.6-8.E CC.3.6.6-8.H	S8.D.1.1 S8.D.1.2 S8.D.1.3 S8.D.2.1	S8.D.3.1.1 S8.D.3.1.2 S8.D.3.1.3 S8.D.2.1.1	What is the essential vocabulary of the unit or concept?

	<ul style="list-style-type: none"> Identify the components of weathering and how it changes Earth Identify how mountains, earthquakes, and volcanoes originate <p>How humans change earth</p> <ul style="list-style-type: none"> Identify and describe the greenhouse effect <p>Earth's water</p> <ul style="list-style-type: none"> Analyze the uses of water Analyze the water cycle's causes and effects <p>Weather and climate</p> <ul style="list-style-type: none"> Compare and contrast weather and climate <p>Solar system</p> <ul style="list-style-type: none"> Identify the components of the solar system Compare rotation and revolution 	<p>skills</p> <ul style="list-style-type: none"> Answering analysis questions based on lab activities Modeling volcanoes and mountains Labeling components of volcanoes and the types Provide examples of natural processes Rock cycle <p>How humans change earth</p> <ul style="list-style-type: none"> Developing communication skills Answering analysis questions based on lab activities Group discussions on human effects Evaluate personal effects on the environment <p>Earth's water</p> <ul style="list-style-type: none"> Developing communication skills Answering analysis questions based on lab activities Model the water cycle Label components of the water cycle <p>Weather and climate</p> <ul style="list-style-type: none"> Developing communication skills Answering analysis questions based on lab activities Graphic organizer of differences between weather and climate Weather and climate sort <p>Solar system</p> <ul style="list-style-type: none"> Developing communication skills Answering analysis questions based on lab activities Model the solar system Label the 8 moon phases Discuss the cause of the changes in the appearance of the moon 	<p>CC.3.5.6-8.A CC.3.5.6-8.C CC.3.5.6-8.E CC.3.5.6-8.H CC.3.5.6-8.I CC.3.5.6-8.J 3.3.8.A6 3.3.8.A7 3.3.8.A5 3.3.8.A4 3.3.8.A3 3.3.8.A2</p>	<p>S8.D.3.1 S8.D.3.2</p>	<p>S8.D.2.1.2 S8.D.2.1.3 S8.D.1.3.1 S8.D.1.3.2 S8.D.1.3.3 S8.D.1.3.4</p>	<p>Rock cycle Igneous rock Weathering Sediment Sedimentary rock Metamorphic rock Magma Erosion Deposition Earthquake Plates Fault Pollution Biodegradable Groundwater Aquifer Watershed Wetland Water cycle Evaporation Humidity Thermometer Barometer Air pressure Climate Solar system Asteroid Meteor Revolution Rotation Orbit Phases</p>
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		<ul style="list-style-type: none"> • Solar system simulation 				
Resources	Materials, texts, videos, internet sites, software, human to support instruction <ul style="list-style-type: none"> • Lab materials • PSSA Preparation Book • Earth Science Textbooks 					
Formative Assessments	What evidence (product and/or performance) will be collected to establish that content and skills are being learned? <ul style="list-style-type: none"> • Exit tickets • Lab reports • Models • Quiz • Do now • Discussion • Stations • Oral questioning • Independent practice 					
Summative Assessments	What evidence (product and/or performance) will be collected to determine that content and skills have been learned? <ul style="list-style-type: none"> • Unit Test 					
Strategies for ELL and IEP Support	What tools, strategies, and resources will be used to provide accommodations and modifications to support students? <ul style="list-style-type: none"> • Productive pacing • Incorporate native languages • Use visuals • Small group teaching • Provide different levels of materials • Simplify language • Repetition • Provide content in multiple forms 					
Acceleration Strategies	What tools, strategies, and resources will be used to help advance students closer to grade-level expectations <ul style="list-style-type: none"> • Scaffolding of material • Collaboration with others • Grouping of students • Concrete examples • Visuals • Integrate technology • Goal setting 					

IAA Curriculum

Content Area	Science	Grade	8th Grade
Course Name	Life Science		

Unit/ Concepts	Unit 6: Physical Science (PSSA Preparation)					
Big Ideas	<ul style="list-style-type: none"> • Structure and properties of matter • Forms and conversions of energy • Energy sources and their environmental impact • Force and motion • A property is a characteristic that can be used to identify and describe matter • Properties are helpful for deciding the uses of different materials • Energy exists in different forms • Differences between kinetic and potential energy • Energy resources in nature are usually classified as either nonrenewable or renewable • A force is a push or pull that acts on an object • Types of forces 					
Key Learning Objectives & Skills	<ul style="list-style-type: none"> • Analyze models of force and motion • Identify structures and reactions with other structures • Identify key vocabulary • Formulate answers to analysis questions • Model Newton's laws • Identify the properties of matter • Use basic math skills to convert energy • Identify different forms of energy • Identify different types of forces 					
Essential Questions	<p>Statements summarizing important ideas and core processes that are central to the unit or concept and have lasting value beyond the classroom.</p> <ul style="list-style-type: none"> • Insulation is used in the walls of homes to prevent the flow of unwanted heat into or out of the home. Why would aluminum not be a good choice for insulating the walls of a house? • As a pendulum swings, its energy is constantly converted between kinetic and potential energy. At which point does a pendulum have the least potential energy and the greatest kinetic energy? Explain. • What are an advantage and a disadvantage of using nuclear energy as a power source? • Explain why balanced forces cannot cause an object to start moving or change an object's direction or speed. 					
Dates (estimates only)	Smart Objectives	Instructional Strategies and Activities	PA CC Standards	Keystone or PSSA Anchors	Keystone / PSSA Eligible Content	Vocabulary
	What do students have to do related to the content?	Used to develop the skills and knowledge	CC.3.6.6-8.A. CC.3.6.6-8.C	S8.C.1.1 S8.C.2.1	S8.A.2.2.1 S8.A.2.2.2	What is the essential

(2 weeks)	<p>Structure and properties of matter</p> <ul style="list-style-type: none"> Identify a property Describe how properties can help to decide the differences of materials Analyze properties of matter and how they relate to the periodic table placement <p>Forms and conversions of energy</p> <ul style="list-style-type: none"> identify 5 forms that energy exists Compare kinetic and potential energy Convert one energy form to another through mathematical calculations <p>Energy sources and their environmental impact</p> <ul style="list-style-type: none"> Compare renewable and nonrenewable energy sources Identify 3 renewable and 3 nonrenewable energy sources Cite evidence of environmental impact by energy sources <p>Force and motion</p> <ul style="list-style-type: none"> Identify force and give one example of it Compare contact and noncontact force Compare balanced and unbalanced forces 	<p>Structure and properties of matter</p> <ul style="list-style-type: none"> Modeling systems Developing communication skills Answering analysis questions based on activities Cite properties of different types of substances Task cards of properties (physical vs. chemical) <p>Forms and conversions of energy</p> <ul style="list-style-type: none"> Modeling systems Developing communication skills Answering analysis questions based on activities Energy conversion formulas Examples of forms of energy Acting out energy forms <p>Energy sources and their environmental impact</p> <ul style="list-style-type: none"> Modeling systems Developing communication skills Answering analysis questions based on activities Research environmental impacts of energy sources <p>Force and motion</p> <ul style="list-style-type: none"> Modeling systems Developing communication skills Answering analysis questions based on activities Modeling force and motion examples Compare balanced and unbalanced forces 	<p>CC.3.6.6-8.E CC.3.6.6-8.H CC.3.5.6-8.A CC.3.5.6-8.C CC.3.5.6-8.E CC.3.5.6-8.H CC.3.5.6-8.I CC.3.5.6-8.J 3.3.8.B2 3.2.8.B6 3.2.8.B4 3.2.8.B1 3.3.8.B1 3.3.8.B2</p>	<p>S8.C.2.2 S8.C.3.1</p>	<p>S8.C.1.1.1 S8.B.1.1.2 S8.C.2.2.1 S8.C.2.2.2 S8.C.2.2.3 S8.C.3.1.1 S8.C.3.1.2 S8.C.3.1.3</p>	<p>vocabulary of the unit or concept?</p> <p>Physical property Chemical property Element Compound Reactant Product Mixture Density Solubility Energy Work Kinetic energy Potential energy Nonrenewable energy Renewable energy Fossil fuels Force Contact force Noncontact force Friction Gravity Speed</p>
Resources	<p>Materials, texts, videos, internet sites, software, human to support instruction</p> <ul style="list-style-type: none"> Lab materials PSSA Preparation Book Physical Science Textbook 					
Formative	<p>What evidence (product and/or performance) will be collected to establish that content and skills are being learned?</p>					

Assessments	<ul style="list-style-type: none"> ● Exit tickets ● Lab reports ● Models ● Quiz ● Do now ● Discussion ● Stations ● Oral questioning ● Independent practice
Summative Assessments	<p>What evidence (produce and/or performance) will be collected to determine that content and skills have been learned?</p> <ul style="list-style-type: none"> ● Unit Test
Strategies for ELL and IEP Support	<p>What tools, strategies, and resources will be used to provide accommodations and modifications to support students?</p> <ul style="list-style-type: none"> ● Productive pacing ● Incorporate native languages ● Use visuals ● Small group teaching ● Provide different levels of materials ● Simplify language ● Repetition ● Provide content in multiple forms
Acceleration Strategies	<p>What tools, strategies, and resources will be used to help advance students closer to grade-level expectations</p> <ul style="list-style-type: none"> ● Scaffolding of material ● Collaboration with others ● Grouping of students ● Concrete examples ● Visuals ● Integrate technology ● Goal setting

IAA Curriculum

Content Area	Science	Grade	8th
Course Name	Life Science		

Unit / Concepts	Unit 7: Waves					
Big Ideas	<p>Themes and connections between the Standards that help students to see the purpose and relevance of content.</p> <ul style="list-style-type: none"> • Characteristics of Sound • Hearing Loss • Digital Transmission of Waves • Characteristics of Light, Ultraviolet Exposure • A wave is a disturbance that repeats regularly in space and time and that transmits energy from one place to another with no transfer of matter. • A common way of describing sound is with the decibel scale. • Hearing is a result of sound waves transmitted through the air and into the different parts of the ear. • Sound can be recorded in its original form (as an analog signal) or converted to a digital signal. • Light is an example of a transverse wave that can travel through a medium or in a vacuum. • Sunglasses and sunscreen can block ultraviolet waves from damaging eyes and skin respectively. 					
Key Learning Objectives & Skills	<ul style="list-style-type: none"> • Analyze data from labs • Model systems • Analyze models • Identify functions • Identify key vocabulary • Formulate answers to analysis questions • Formulate predictions • Investigate digital transmission of waves 					
Essential Questions	<p>Statements summarizing important ideas and core processes that are central to the unit or concept and have lasting value beyond the classroom.</p> <ul style="list-style-type: none"> • How can I represent a simple model for waves using mathematics? • Under what circumstances are waves reflected, absorbed, or transmitted? • What makes digitized signals a more reliable way to encode and transmit information than analog signals? • What are the properties of the waves and how do waves transmit sound and light energy? • How are sound and light waves similar and different? • What happens when waves move from air to another material, such as water, a mirror, or cloth? • When are waves harmful? • How do scientists and engineers use waves for research and communication? 					
Dates (estimates only)	Smart Objectives	Instructional Strategies and Activities	PA CC Standards	Keystone or PSSA Anchors	Keystone / PSSA Eligible Content	Vocabulary
	What do students have to do related	Used to develop the skills and				What is the

(3 weeks)	to the content?	knowledge				essential vocabulary of the unit or concept?
	<p>Digital Transmission of Waves</p> <ul style="list-style-type: none"> Identify patterns between simple models for waves that includes how the amplitude, wavelength, and frequency of a wave is related to the energy in a wave. Distinguish how light and sound energy are transmitted by waves. Interpret that waves are reflected, absorbed, or transmitted through various materials. <p>Characteristics of Light, Ultraviolet Exposure</p> <ul style="list-style-type: none"> Summarize the claim that digitized signals (sent as wave pulses) are a more reliable way to encode and transmit information. Model that visible light is a mixture of many different colors. Interpret the construct of the electromagnetic spectrum. 	<p>Digital Transmission of Waves</p> <ul style="list-style-type: none"> Lab based learning Modeling systems Reading scientific procedures Keeping a science notebook Constructing a concept map Developing communication skills Answering analysis questions based on lab activities Model waves with sheets Graph the speed of light on paper and computer Identify visuals of vocabulary <p>Characteristics of Light, Ultraviolet Exposure</p> <ul style="list-style-type: none"> Lab based learning Modeling systems Reading scientific procedures Keeping a science notebook Constructing a concept map Developing communication skills Answering analysis questions based on lab activities Discuss the effects of light exposure Model visible light and the changes Debate the more reliable way to encode information 	<p>CC.3.6.6-8.A. CC.3.6.6-8.C CC.3.6.6-8.E CC.3.6.6-8.H CC.3.5.6-8.A CC.3.5.6-8.C CC.3.5.6-8.E CC.3.5.6-8.H CC.3.5.6-8.I. CC.3.5.6-8.J 3.3.8.B2 3.2.8.B6 3.2.8.B4 3.2.8.B1 3.3.8.B1 3.3.8.B2</p>	<p>S8.C.1.1 S8.C.2.1 S8.C.2.2 S8.C.3.1</p>	<p>S8.A.2.1.1 S8.A.2.1.2 S8.A.2.1.3 S8.A.2.1.4 S8.A.2.1.5 S8.A.2.1.6</p>	<p>absorption amplitude analog decibel (dB) digital electromagnetic spectrum evidence frequency infrared longitudinal wave medium reflection refraction sound intensity speed of sound trade-off transmission transverse wave ultraviolet Visible light spectrum Wave wavelength</p>
Resources	<p>Materials, texts, videos, internet sites, software, human to support instruction</p> <ul style="list-style-type: none"> SEPUP-Lab aids textbook <ul style="list-style-type: none"> Lab activities Videos Materials to model content 					
Formative Assessments	<p>What evidence (product and/or performance) will be collected to establish that content and skills are being learned?</p> <ul style="list-style-type: none"> Exit tickets Lab reports Models Quiz 					

	<ul style="list-style-type: none"> • Do now • Discussion • Stations • Oral questioning • Independent practice
Summative Assessments	<p>What evidence (produce and/or performance) will be collected to determine that content and skills have been learned?</p> <ul style="list-style-type: none"> • Unit Test • Project
Strategies for ELL and IEP Support	<p>What tools, strategies, and resources will be used to provide accommodations and modifications to support students?</p> <ul style="list-style-type: none"> • Productive pacing • Incorporate native languages • Use visuals • Small group teaching • Provide different levels of materials • Simplify language • Repetition • Provide content in multiple forms
Acceleration Strategies	<p>What tools, strategies, and resources will be used to help advance students closer to grade-level expectations</p> <ul style="list-style-type: none"> • Scaffolding of material • Collaboration with others • Grouping of students • Concrete examples • Visuals • Integrate technology • Goal setting