

Newburyport Curriculum Map

8th Grade Science

	<p>Grade Level: 8 Team Members: Mary Kate Allan, Sara Robertson Number of Days of Unit: 2.5 months</p>	
	Changes in the Atmosphere	
Essential Questions	<ul style="list-style-type: none"> ● What is the structure of the atmosphere? (layers & the features within each layer) ● How is heat transferred within the atmosphere? (How are conduction, convection, & radiation different from one another? How are local winds different from global winds? (structure & function)) ● What is the function of the greenhouse effect on the planet? ● To what extent does climate change impact our environment? 	
Content Standards	<p>ESS1-1b . Develop and use a model of the Earth-Sun system to explain the cyclical pattern of seasons, which includes Earth’s tilt and differential intensity of sunlight on different areas of Earth across the year.</p> <p>ESS2-5 Earth’s systems: Interpret basic weather data to identify patterns in air mass interactions and the relationship of those patterns to local weather.</p> <p>ESS2-6 Describe how interactions involving the ocean affect weather and climate on a regional scale, including the influence of the ocean temperature as mediated by energy input from the Sun and energy loss due to evaporation or redistribution via ocean currents.</p> <p>ESS3-5 Examine and interpret data to describe the role that human activities have played in causing the rise in global temperatures over the past century.</p>	
Concepts and subskills	<p>Students will show learning by completing written notes, orally sharing their ideas during whole class discussions, filling in critical reading questions within the workbook (chapter 5 & 6), verbally presenting their ideas in the form of a group presentation, collaborating with a group to create a physical product (solar oven to cook s’mores), and show content mastery on a comprehensive unit test.</p>	<p>Practices:</p> <ol style="list-style-type: none"> 1. Asking questions. 2. Developing and using models 3. Planning and carrying out investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations 7. Engaging in argument from evidence

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		8. Obtaining, evaluating, and communicating information
Content Objectives "I Can Statements"	<p>I can explain air pressure & factors affecting it.</p> <p>I can identify the layers and explain at least one importance.</p> <p>I can develop and use a model to .</p> <p>I can identify the types of fronts and connect them to CCR.</p> <p>I can explain the weather associated with the different types of fronts and describe why this weather occurs.</p> <p>I can analyze and interpret ocean current and temperature data to explain how oceans affect the weather.</p> <p>I can explain climate change using my knowledge of air pressure & the methods of heat transfer (CCR).</p> <p>I can identify actions that lead to climate change as well as actions that can be taken to work towards reducing climate change.</p>	
Content Vocabulary	atmosphere altitude air pressure density temperature high pressure low pressure conduction convection radiation troposphere mesosphere stratosphere ozone layer humidity wind global winds sea breeze land breeze front greenhouse effect greenhouse gasses climate change earth's tilt seasons	

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	<p>clouds precipitation condensation u.v. radiation infrared radiation thermosphere heat</p>
Text, Materials, and Resources	<ul style="list-style-type: none"> * Savvas Realize Interactive Science Grade 8 Workbook * Teacher created slideshows for notes *solar oven direction packet *a day at the beach notes sheet/stations materials *Videos: 1 degree factor *Plum Island Podcast *Fold-able for Layers of the Atmosphere *Mythbusters - Student Edition
Assessments, Products, Projects	<ul style="list-style-type: none"> ● Air Pressure Explanations - ● Climocgraph - (ESS2-6) ● Quiz on Methods of Heat Transfer ● Virtual Lab: Flying through the Atmosphere ● Solar Oven Design ● Severe Storm Project/Presentations ● Climate Change - Carbon Footprint ● Unit Assessment - Edulastic

	<p>Grade Level: 8 Team Members: Mary Kate Allan and Sara Robertson Number of Days of Unit: 2 months</p>
	Genetics
Essential Questions	<ul style="list-style-type: none"> ● What are the structures & functions of the organelles within a cell? ● What is the structure & function of DNA? ● What is heredity? ● How can you use a Punnett Square to analyze patterns of inheritance? ● How do mutations affect the physical traits observed in offspring? ● What are some of the advances in genetic engineering and selective breeding?

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	<ul style="list-style-type: none"> • How have advances in science affected the way we study and work with genetics? 	
Content Standards	<p>LS1-5 Construct an argument based on evidence for how environmental and genetic factors influence the growth of organisms.</p> <p>LS3-1 Develop and use a model to describe that structural changes to genes (mutations) may or may not result in changes to proteins, and if there are changes to proteins there may be harmful, beneficial, or neutral changes to traits.</p> <p>LS3-2. Construct an argument based on evidence for how asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. Compare and contrast advantages and disadvantages of asexual and sexual reproduction.</p> <p>LS3-3 Communicate through writing and in diagrams that chromosomes contain many distinct genes and that each gene holds the instructions for the production of specific proteins, which in turn affects the traits of an individual.</p> <p>LS3-4: Develop and use a model to show that sexually reproducing organisms have two of each chromosome in their cell nuclei, and hence two variants (alleles) of each gene that can be the same or different from each other, with one random assortment of each chromosome passed down to offspring from both parents.</p> <p>LS4-5 Synthesize and communicate information about artificial selection, or the ways in which humans have changed the inheritance of desired traits in organisms.</p>	
Concepts and subskills	<p>Students will show learning by completing written notes, orally sharing their ideas during whole class discussions, filling in critical reading questions within the workbook (chapter 9 & 10), modeling the DNA through physical means (pipe-cleaners), analyze punnett square results and “create their own creature offspring”, collaborating with a group to create a multimedia presentation, and show content mastery on a comprehensive unit test.</p>	<p>Practices</p> <ol style="list-style-type: none"> 1. Asking questions 2. Developing and using models 3. Analyzing and interpreting data 4. Using mathematics and computational thinking 5. Constructing explanations 6. Engaging in argument from evidence 7. Obtaining, evaluating, and communicating information
Content Objectives "I Can Statements"	<p>I can explain the function of the nucleus, chromosomes, ribosomes and mitochondria in a cell and relate these to cellular respiration, photosynthesis and genetics.</p> <p>I can define the basic terms related to genetics: gene, allele, dominant, recessive, homozygous, heterozygous, genotype and phenotype.</p> <p>I can accurately complete a punnett square to determine the probability of a trait being inherited. I can do this for dominant/recessive traits, multiple alleled traits and sex-linked traits.</p> <p>I can define DNA and identify the structure, including the nitrogen bases.</p> <p>I can explain the differences and similarities between mitosis and meiosis.</p> <p>I can explain how a trait can be passed from one generation to the next.</p>	
Content Vocabulary	<p>Dominant Allele Recessive Allele Genotype</p>	

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	<p>Phenotype Purebred vs. Hybrid Homozygous Heterozygous Incomplete Dominance Codominance Multiple Alleles Polygenic Inheritance Meiosis Nitrogen Base Amino Acid Protein DNA DNA Replication Sex-linked gene Mutation</p>
Text, Materials, and Resources	<p>*Savvas Realize Interactive Science Grade 8 Workbook *teacher created slideshow for notes *Videos: Life According to Sam, Cracking Your Genetic Code, Dear 16 Year Old Me *Accountable Talk Articles: Scientists & Mutations with connections to Medicine</p>
Assessments, Products, Projects	<ul style="list-style-type: none"> ● Punnett Square Assessments ● Creature Breeding Project ● PSA group project ● Accountable Talk Group Work: Critical Reading ● Virtual Lab: Fruit Flies ● Unit Assessment - Edulastic
	<p>Grade Level: 8 Team Members: Mary Kate Allan Number of Days of Unit: 2 months</p>
	<p>Evolution</p>
Essential	<ul style="list-style-type: none"> ● How do organisms change over time?

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Questions	<ul style="list-style-type: none"> ● What scientific evidence exists to prove that organisms change over time and adapt to their environment? ● What factors affect evolution? 	
Content Standards	<p>*LS1-4 Construct an explanation based on evidence for how characteristic animal behaviors and specialized plant structures increase the probability of successful reproduction of animals and plants</p> <p>*LS4-4 Use a model to describe the process of natural selection, in which genetic variations of some traits in a population increase some individuals' likelihood of surviving and reproducing in a changing environment. Provide evidence that natural selection occurs over many generations.</p> <p>*LS4-5 Synthesize and communicate information about artificial selection, or the ways in which humans have changed the inheritance of desired traits in organisms.</p>	
Concepts and subskills	<p>Students will show learning by completing written notes, orally sharing their ideas during whole class discussions, filling in critical reading questions within the workbook (chapter 11), modeling the process of natural selection through paper airplanes, demonstrated the process of Evolution by creating a visual (poster), and they synthesized their understanding by developing a product and marketing that product to an audience through the design and engineering process and show content mastery on a comprehensive unit assessment.</p>	<p>Practices</p> <ol style="list-style-type: none"> 1. Asking questions 2. Analyzing and interpreting data 3. Constructing explanations 4. Engaging in argument from evidence
Content Objectives "I Can Statements"	<p>I can define a mutation and explain how mutations may occur, including genetic mistakes as well as environmental factors.</p> <p>I can explain how mutations can lead to change and how natural selection can lead to evolution. I can use evidence to prove this.</p> <p>I can discuss how humans can play a role in the evolution of other organisms.</p>	
Content Vocabulary	<p>Adaptation</p> <p>Species</p> <p>Evolution</p> <p>Fossils</p> <p>Natural Selection</p>	

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	<p>Artificial Selection</p> <p>Variation</p> <p>Overproduction</p> <p>Competition</p> <p>Homologous Structures</p> <p>DNA Similarities</p> <p>Embryological Similarities</p> <p>Environmental Change</p> <p>Gradualism</p> <p>Punctuated Equilibrium</p>
Text, Materials, and Resources	<p>*Savvas Realize Interactive Science Grade 8 Workbook</p> <p>*Teacher created slideshow for notes</p> <p>*Videos: Planet Earth Jungles, Alan Alda Galapagos Video, Antibiotic Resistance Catalyst Video</p> <p>*Tricky Ticks Worksheet</p> <p>*Accountable Talk Articles: on current evolution in nature</p>
Assessments, Products, Projects	<ul style="list-style-type: none"> ● Evolution Assessment - Edulastic ● Evolution Poster ● Adaptive Biomimicry Design Project

	<p>Grade Level: 8</p> <p>Team Members: Mary Kate Allan and Sara Robertson</p> <p>Number of Days of Unit: 2 months</p>
	<p>Physics: The Nature of Forces</p>
Essential Questions	<ul style="list-style-type: none"> ● What is motion? What causes motion? How do you know that something is moving? ● How do you calculate motion? ● What is the role of forces at work in our daily lives?

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	<ul style="list-style-type: none"> • What are Newton's Laws of motion? • How can potential energy be converted to kinetic energy? 	
Content Standards	<p>PS2-1 Develop a model that demonstrates Newton's third law involving the motion of two colliding objects.</p> <p>PS2-2 Provide evidence that the change in an object's speed depends on the sum of the forces on the object (the net force) and the mass of the object.</p> <p>PS3-1: Construct and interpret data and graphs to describe the relationships among kinetic energy, mass, and speed of an object.</p> <p>PS3-2 Develop a model to describe the relationship between the relative positions of objects interacting at a distance and their relative potential energy in the system.</p> <p>PS3-5 Present evidence to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.</p> <p>PS3-7 Use informational text to describe the relationship between kinetic and potential energy and illustrate conversions from one form to another.</p>	
Concepts and subskills	<p>Students will show learning by completing written notes, orally sharing their ideas during whole class discussions, filling in critical reading questions within the workbook (chapter 15) & additional outside readings, collecting data, displaying data visually on a graph, analyzing the graphs for motion/speed, construct a model that shows changes in motion & demonstrates the effect of forces that act on an object, and show content mastery on a comprehensive unit assessment.</p>	<p>Practices</p> <ol style="list-style-type: none"> 1. Asking questions. 2. Developing and using models 3. Planning and carrying out investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations 7. Designing solutions to problems 8. Engaging in argument from evidence 9. Obtaining, evaluating, and communicating information
Content Objectives "I Can Statements"	<p>I can describe motion and calculate speed, distance and time.</p> <p>I can describe acceleration and how force affects this change in motion.</p> <p>I can calculate acceleration using a given formula.</p> <p>I can describe how force affects the motion of an object and demonstrate this through vectors.</p> <p>I can explain and demonstrate Newton's first law of motion, including inertia.</p> <p>I can explain and demonstrate Newton's second law of motion: $F=M \times A$, and explain how the mass of an object affects its ability to move.</p> <p>I can explain and demonstrate Newton's third law of motion: "For every action there is an equal and opposite reaction".</p> <p>I can demonstrate how an object's position affects the potential and kinetic energy the object contains and thus, how these two energies transfer between the two.</p>	

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Content Vocabulary	<p>Motion</p> <p>Frame of Reference</p> <p>Speed/Velocity</p> <p>Acceleration</p> <p>Sliding Friction</p> <p>Rolling Friction</p> <p>Fluid Friction</p> <p>Static Friction</p> <p>Gravity/Law of Universal Gravitation</p> <p>Mass vs. Weight</p> <p>Force (balanced and unbalanced)</p> <p>Newton's 1st Law</p> <p>Newton's 2nd Law</p> <p>Newton's 3rd Law</p> <p>Potential Energy</p> <p>Kinetic Energy</p>
Text, Materials, and Resources	<p>*Savvas Realize Interactive Science Grade 8 Workbook</p> <p>*Teacher created slideshow for notes: Physics Notes</p> <p>*Metric Ladder</p> <p>*Speed Practice Problems</p> <p>*Acceleration Practice Problems</p> <p>*Vector Practice Worksheet</p> <p>*Newton's Laws Stations</p> <p>*CPO equipment</p> <p>*Ski Lift/Roller Coaster/Rube Goldberg Project Materials</p>
Assessments, Products, Projects	<ul style="list-style-type: none"> ● Calculating Motion Assessment ● Graphing interpretation and construction ● Newton's Laws of Motion Sorting ● Unit Assessment - Edulastic ● Construction Project - Rube Goldberg

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	Grade Level: 8 Team Members: Mary Kate Allan and Sara Robertson Number of Days of Unit: 1.5 months	
	Human Body	
Essential Questions	<ul style="list-style-type: none"> ● How is the human body organized? ● How do our body systems work together to keep us healthy and alive? ● What is needed in order for our bodies to create Energy for survival? 	
Content Standards	LS1-2. Develop and use a model to describe how parts of cells contribute to the cellular functions of obtaining food, water, and other nutrients from its environment, disposing of wastes, and providing energy for cellular processes. LS1-3 . Construct an argument supported by evidence that the body systems interact to carry out essential functions of life.	
Concepts and subskills	Students will show learning by completing written notes, orally sharing their ideas during whole class discussions, filling in critical reading questions aligned with outside readings, collecting data on heart rate & respiratory rate, displaying data visually on a graph, create cartoons with the immune system, construct a virtual model of blood flow in interaction with the circulatory & respiratory systems, diagram and label the human body with the essential parts, visually and in words connect how the role of one system collaborates with other body systems and show content mastery on a comprehensive unit assessment. If time permits, we may construct models of the human body (organs or systems)	Practices <ol style="list-style-type: none"> 1. Asking questions 2. Developing and using models 3. Planning and carrying out investigations 4. Analyzing and interpreting data 5. Constructing explanations
Content Objectives "I Can Statements"	I can identify, describe and explain the function of the respiratory system. I can identify, describe and explain the function of the circulatory system. I can describe and explain how the circulatory and respiratory systems work together to transport oxygen throughout the body. I can identify, describe and explain the main function of the digestive system. I can describe and explain how the circulatory, respiratory and digestive systems work together to create energy for the body. I can identify, describe and explain the function of the immune system. I can identify, describe and explain the function of the endocrine system. I can identify, describe and explain the function of the reproductive system. I can describe and explain how the circulatory, endocrine and reproductive systems work together to allow for growth and development of an offspring. I can identify, describe and explain the function of the nervous system. I can describe and explain how the nervous system works with other systems to allow the human body to function.	

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Content Vocabulary	Esophagus Liver Pancreas Small Intestine Large Intestine Veins Arteries Capillaries Alveoli Villi Bronchial tube Pleura Trachea Larynx Kidneys Ureter Urethra Bladder Pathogen Antigen Antibody Neuron Synapse Autonomic Somatic Gland Hormone Pineal Body Hypothalamus Pituitary Testes Ovary Cervix

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	<p>Uterus ATP</p>
<p>Text, Materials, and Resources</p>	<p>*Interactive Science Human Body Systems for Realize - digital *Teacher created Slideshows *Videos: Crash Course in Human Body, Waste on the Way Out, Nat Geo Extraordinary Humans, Life's Greatest Miracle (Miracle of Making Me) * Lab on Respiratory Circulatory Connection *Handshake Activity with Pathogens *Vaping Websites/Articles/ Resources</p>
<p>Assessments, Products, Projects</p>	<ul style="list-style-type: none"> ● Content Assessments - Google Forms per system ● Connections Assignment - visual connections between 4 systems ● Unit Assessment - Edulastic