

West Deptford Middle School Curriculum Map
Science - Grade 8

Unit/ Duration	Essential Questions	Content	Skills	Assessment	Standards
Unit 1: Forces and Motion 4 Weeks	<ul style="list-style-type: none"> • What causes motion to occur? • What do motion graphs look like for objects moving with constant velocity? • What do graphs look like for objects that are accelerating? • How is the speed of an object calculated? • How is velocity similar / different from velocity? • How is acceleration calculated? • How do unbalanced forces affect the 	<ul style="list-style-type: none"> • 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 direction (Newton's third law). • 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 the object, the greater the force needed to achieve the same change in motion. 	<ul style="list-style-type: none"> • Interpret motion graphs • Calculate speed. • Calculate Weight. • Calculate Force. • Explain any moving object using Newton's Laws. • Calculate momentum. • Calculate basic sum of force problems. 	<ul style="list-style-type: none"> • Formative Assessment • Quiz 1: Motion • Lab 1: Graphing Motion Simulation Lab • Lab 2: Constant Speed Graphical Analysis Lab • Lab 3: Accelerated Motion Lab • Quiz 2: Graphing Motion • Lab 4: Sticky Sneakers • Quiz 3: Forces • Lab 5: Forces and Friction Simulation Lab • Quiz 4: Newton's Laws 	<ul style="list-style-type: none"> • SCI.MS-PS2-1 • SCI.MS-PS2-2 • SCI.MS-PS2-3 • SCI.MS-PS2-4 • SCI.MS-PS2-5 • LA.6-8.CCSS.ELA-Literacy.RST.6-8.1 • LA.6-8.CCSS.ELA-Literacy.RST.6-8.3 • LA.6-8.CCSS.ELA-Literacy.WHST.6-8.1 • LA.6-8.CCSS.ELA-Literacy.WHST.6-8.7 • 8.1.8.B.1 • 8.1.8.C.1 • 9.2

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	<p>motion of an object?</p> <ul style="list-style-type: none"> • How does friction affect an object when at rest or in motion? • What are the biggest factors that affect the force of gravity? 	<p>For any given object, a larger force causes a larger change in motion.</p> <ul style="list-style-type: none"> • All positions of objects and the directions of forces and motions must be described in an arbitrarily chosen reference frame and arbitrarily chosen units of size. In order to share information with other people, these choices must also be shared. • Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, 		<ul style="list-style-type: none"> • Lab 6: Newton's 3rd Law and Momentum Lab • Quiz 5: Newton's 3rd Law & Momentum • Lab 7: Newton's Laws of Motion • Unit Test 	
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		<p>currents, or magnetic strengths involved and on the distances between the interacting objects.</p> <ul style="list-style-type: none">• Gravitational forces are always attractive. There is a gravitational force between any two masses, but it is very small except when one or both of the objects have large mass—e.g., Earth and the sun.• 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			
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		effect on a test object (a charged object, or a ball, respectively).		
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Unit/ Duration	Essential Questions	Content	Skills	Assessment	Standards
Unit 2: Types of Interactions 4 Weeks	<ul style="list-style-type: none"> • How are forces exerted over a distance? • What causes a <ul style="list-style-type: none"> ○ a) gravitational field, ○ b) electric field, and a ○ c) magnetic field? • What are the three types of fields discussed in this unit? How are they similar? How are they different? 	<ul style="list-style-type: none"> • Source and factors that affect gravitation. • Source and factors that affect electrical forces. • Sources and factors that affect magnetic forces. • The interrelationships between electricity & magnetism 	<ul style="list-style-type: none"> • Differentiate between the transfers of force via direct contact vs. fields. • Explain that mass and distance of separation affect the magnitude of gravitational attraction. • Diagram/explain charge distribution in positive and negative objects. • Sketch/explain electric fields. 	<ul style="list-style-type: none"> • Formative Assessment • Lab 1: Gravity Simulation Lab • Quiz 1: The Transfer of Forces • Lab 2: Electrostatics Lab • Lab 3: Electric Fields and Forces Simulation • Quiz 2: Interactions Between Charges 	<ul style="list-style-type: none"> • SCI.MS-PS2-1 • SCI.MS-PS2-2 • SCI.MS-PS2-3 • SCI.MS-PS2-4 • SCI.MS-PS2-5 • LA.6-8.CCSS.ELA-Literacy.RST.6-8.1 • LA.6-8.CCSS.ELA-Literacy.RST.6-8.3 • LA.6-8.CCSS.ELA-Literacy.WHST.6-8.1 • LA.6-8.CCSS.ELA-Literacy.WHST.6-8.7 • 8.1.8.B.1 • 8.1.8.C.1 • 9.2 •

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	<ul style="list-style-type: none"> • What happens to the strength of a field as we move farther away from its source? 		<ul style="list-style-type: none"> • Explain that charge strength and distance of separation affect the magnitude of electrical forces. • Diagram/explain the source of magnetism in terms of magnetic domains. • Sketch/explain magnetic fields. • Explain that magnetic strength and distance of separation affect the magnitude of magnetic forces. • Identify the fact that moving electric charge produces magnetic fields and vice versa. 	<ul style="list-style-type: none"> • Lab 4: Magnetism Lab • Lab 5: Magnetic Fields Simulation • Quiz 3: Magnetic Forces and Fields • Quiz 4: Electromagnetic Interactions • Lab 6: Electromagnetism Lab • Unit Test: Types of Interactions 	
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Unit/ Duration	Essential Questions	Content	Skills	Assessment	Standards
Unit 3: Energy of Objects In Motion 3-4 Weeks	<ul style="list-style-type: none"> • What is work? • What types of energy make up mechanical energy? • How is mechanical energy transferred from one form to another? 	<ul style="list-style-type: none"> • The difference between mechanical and non-Mechanical energy. • The variables that kinetic energy depend upon. • The variables that gravitational potential energy depend upon. • The variables that elastic potential energy depend upon. • The Law of Conservation of Energy states that energy can be transferred from one type to another, but cannot be created or destroyed. 	<ul style="list-style-type: none"> • Calculate when work is done on a system. • Calculate kinetic energy. • Calculate gravitational potential energy . • Calculate elastic potential energy. • Demonstrate understanding of mechanical energy transfer via diagrams. 	<ul style="list-style-type: none"> • Quiz 1: Work & Energy Quiz • Lab 1: Kinetic Energy Lab • Quiz 2: Kinetic Energy • Lab 2: Gravitational Potential Energy Lab • Quiz 3: Potential Energy • Lab 3: Conservation of Energy Lab • Quiz 4: Conservation of Energy • Formative assessment in the form of the Multiple Choice review question presentation will 	<ul style="list-style-type: none"> • LA.6-8.CCSS.ELA-Literacy.RST.6-8.1 • LA.6-8.CCSS.ELA-Literacy.RST.6-8.3 • LA.6-8.CCSS.ELA-Literacy.RST.6-8.7 • LA.6-8.CCSS.ELA-Literacy.WHST.6-8.1 • LA.6-8.CCSS.ELA-Literacy.WHST.6-8.7 • SCI.MS-PS3-2 • LA.8.CCSS.ELA-Literacy.SL.8.5 • SCI.MS-PS3-1 • SCI.MS-PS3-5 • 8.1.8.B.1 • 8.1.8.C.1 • 8.2.8.A.1 • 9.2

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		<ul style="list-style-type: none"> The difference between renewable and non-renewable energy sources. How different types of energy resources convert mechanical energy into electrical energy. 		<p>aid in assessing student comprehension prior to the unit test.</p> <ul style="list-style-type: none"> Test: Energy of Objects in Motion 	
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Unit/ Duration	Essential Questions	Content	Skills	Assessment	Standards
Unit 4: Thermal Energy 4-5 Weeks	<ul style="list-style-type: none"> How is temperature related to kinetic energy? What are three scales commonly used to measure temperature and how do they relate to one another? 	<ul style="list-style-type: none"> The temperature of a substance is proportional to the average kinetic energy of the substance's molecules . Things expand when heated and contract when cooled due to the increase/decreas 	<ul style="list-style-type: none"> Relate the motion and spacing of a substance's particles to the substance's temperature. Describe why object's expand or contract in terms of the temperature change of the object as well as 	<ul style="list-style-type: none"> Formative Assessment Lab 1: Temperature and KE Lab Quiz 1: Temperature and Kinetic Energy Quiz 	<ul style="list-style-type: none"> LA.6-8.CCSS.ELA-Literacy.RST.6-8.1 LA.6-8.CCSS.ELA-Literacy.RST.6-8.3 LA.6-8.CCSS.ELA-Literacy.RST.6-8.7 LA.6-8.CCSS.ELA-Literacy.WHST.6-8.1 LA.6-8.CCSS.ELA-Literacy.WHST.6-8.7 SCI.MS-PS3-2

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	<ul style="list-style-type: none"> • Why do things feel hot or cold? • What is the definition of thermal energy and how does it relate to heat? • How do conductors and insulators differ? • What are the 1st and 2nd laws of thermodynamics? • What to heat engines do? 	<p>e in kinetic energy.</p> <ul style="list-style-type: none"> • The three common scales to measure temperature (Kelvin, Celsius, and Fahrenheit) • The difference between temperature and thermal energy • Three methods of heat transfer: convection, conduction and radiation • How conductors and insulators differ • The direction of heat flow and the 2nd law of thermodynamics. • The variables that affect temperature 	<p>the motion of the object's particles.</p> <ul style="list-style-type: none"> • Measure a substance's temperature using a standard thermometer and convert between Kelvin, Celsius and Fahrenheit. • Relate thermal expansion/contraction to how thermometers work. • Identify when substances can have the same temperature but possess different amounts of thermal energy. • Differentiate between examples of convection, conduction and radiation. 	<ul style="list-style-type: none"> • Lab 2: Thermal Energy Transfer • Lab 3: Conductors and Insulators • Quiz 2: Thermal Energy Transfer Part I • Lab 4: Thermal Energy Transfer II • Quiz 3: Thermal Energy Transfer Part II • Lab 5: Thermodynamics 	<ul style="list-style-type: none"> • SCI.MS-PS3-4 • LA.8.CCSS.ELA-Literacy.SL.8.5 • SCI.MS-PS3-3 • 8.1.8.B.1 • 8.1.8.C.1 • 8.2.8.A.1 • 9.2
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		<p>change in an object.</p> <ul style="list-style-type: none"> • The definition of specific heat (capacity). • The 1st law of thermodynamics and how it relates to energy • What heat engines do 	<ul style="list-style-type: none"> • Use their knowledge of conductors and insulators to maximize and minimize thermal energy transfer. • Determine temperature changes between two objects that exchange thermal energy. • Be able to describe what happens to usable energy in a system. • Describe the relationship between energy transferred, type/amount of matter, and temperature. • Use the thermal energy/specific heat equation to calculate: 	<ul style="list-style-type: none"> • Quiz 4: Thermodynamics • Unit Test: Thermal Energy 	
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			<p>temperature change, heat added or lost, mass of objects, and specific heats.</p> <ul style="list-style-type: none">• Determine qualitatively the relative temperature of objects given a heat input and the objects' specific heat capacity.• Describe examples of the 1st law of thermodynamics• Identify examples of heat engines, specifically an internal combustion engine.		
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Unit 5: Evidence of Common Ancestry and Diversity 2-3 Weeks	<ul style="list-style-type: none"> • What are fossils and how are they created? • What is the geological timeline? • What evolution and what are the mechanisms for evolution? • How do anatomical similarities and differences help reconstruct evolutionary history? • What is embryological development and how does it support a common ancestry? 	<ul style="list-style-type: none"> • The collection of fossils and their placement in chronological order (e.g., through the location of the sedimentary layers in which they are found or through radioactive dating) is known as the fossil record. It documents the existence, diversity, extinction, and change of many life forms throughout the history of life on Earth. • Anatomical similarities and differences between various organisms living today and 	<ul style="list-style-type: none"> • Describe the different types of fossils and how they are formed. • Explain the impact of fossils • Describe the mechanisms for evolution • Describe the theory of evolution and common ancestry 	<ul style="list-style-type: none"> • Formative Assessment • Various Lab Activities • Quizzes • Tests 	<ul style="list-style-type: none"> • SCI.MS-LS4-4 • LA.6-8.CCSS.ELA-Literacy.RST.6-8.1 • LA.6-8.CCSS.ELA-Literacy.RST.6-8.7 • SCI.MS-LS4-3 • LA.6-8.CCSS.ELA-Literacy.WHST.6-8.2 • LA.6-8.CCSS.ELA-Literacy.WHST.6-8.9 • LA.8.CCSS.ELA-Literacy.SL.8.1 • LA.8.CCSS.ELA-Literacy.SL.8.4 • SCI.MS-LS4-2 • SCI.MS-LS4-1 • 8.1.8.B.1 • 8.1.8.C.1 • 9.2

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		<p>between them and organisms in the fossil record, enable the reconstruction of evolutionary history and the inference of lines of evolutionary descent.</p> <ul style="list-style-type: none">• Comparison of the embryological development of different species also reveals similarities that show relationships not evident in the fully-formed anatomy.• Natural selection leads to the predominance of certain traits in a population, and the suppression of others.• Adaptation by natural selection			
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		<p>acting over generations is one important process by which species change over time in response to changes in environmental conditions. Traits that support successful survival and reproduction in the new environment become more common; those that do not become less common. Thus, the distribution of traits in a population changes.</p>			
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Unit 6: Inheritance and Variation of Traits 5-6 Weeks	<ul style="list-style-type: none"> • How do children get traits from their parents? • Why do some people look more like their dad and some look more like their mom? • What is a Punnett Square and how does it help us predict the traits of offspring? • Why do some children show traits that neither of their parents display? • Why are some people born with birth defects or diseases? 	<ul style="list-style-type: none"> • The collection of fossils and their placement in chronological order (e.g., through the location of the sedimentary layers in which they are found or through radioactive dating) is known as the fossil record. It documents the existence, diversity, extinction, and change of many life forms throughout the history of life on Earth. • Anatomical similarities and differences between various organisms living today and 	<ul style="list-style-type: none"> • Properly complete a Punnett Square and use it to predict the genes of offspring • Use an organism's genotype to describe the physical characteristics of the object • Properly perform test crosses to determine an unknown genotype • Demonstrate appropriate research skills and teach the class about birth defects and genetic mutations 	<ul style="list-style-type: none"> • Formative Assessment • Various Lab Activities • Quizzes • Tests 	<ul style="list-style-type: none"> • LA.6-8.CCSS.ELA-Literacy.RST.6-8.1 • LA.6-8.CCSS.ELA-Literacy.RST.6-8.7 • LA.6-8.CCSS.ELA-Literacy.WHST.6-8.2 • LA.6-8.CCSS.ELA-Literacy.WHST.6-8.9 • LA.8.CCSS.ELA-Literacy.SL.8.1 • LA.8.CCSS.ELA-Literacy.SL.8.4 • SCI.MS-LS3-1 • SCI.MS-LS3-2 • 8.1.8.B.1 • 8.1.8.C.1 • 9.2

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		<p>between them and organisms in the fossil record, enable the reconstruction of evolutionary history and the inference of lines of evolutionary descent.</p> <ul style="list-style-type: none">• Comparison of the embryological development of different species also reveals similarities that show relationships not evident in the fully-formed anatomy.• Natural selection leads to the predominance of certain traits in a population, and the suppression of others.• Adaptation by natural selection			
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		<p>acting over generations is one important process by which species change over time in response to changes in environmental conditions. Traits that support successful survival and reproduction in the new environment become more common; those that do not become less common. Thus, the distribution of traits in a population changes.</p>			
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Unit 7: The History Of Planet Earth 3 Weeks	<ul style="list-style-type: none"> • What materials make up our Earth? • How can rocks and fossils help us make a chronology of Earth's history? 	<ul style="list-style-type: none"> • The geologic time scale interpreted from rock strata provides a way to organize Earth's history. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale. • Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches. • The planet's systems interact over scales that 	<ul style="list-style-type: none"> • Demonstrate skills similar to those of a paleontologist. • Use rock strata to determine the relative age of fossils. • Demonstrate how radiometric dating can help scientists determine the absolute ages of objects 	<ul style="list-style-type: none"> • Formative Assessment • Various Lab Activities • Quizzes • Tests 	<ul style="list-style-type: none"> • SCI.MS-ESS2-1 • LA.6-8.CCSS.ELA-Literacy.RST.6-8.1 • LA.6-8.CCSS.ELA-Literacy.RST.6-8.7 • LA.6-8.CCSS.ELA-Literacy.RST.6-8.9 • LA.6-8.CCSS.ELA-Literacy.WHST.6-8.2 • LA.6-8.CCSS.ELA-Literacy.WHST.6-8.8 • SCI.MS-ESS1-4 • LA.8.CCSS.ELA-Literacy.SL.8.5 • 8.1.8.B.1 • 8.1.8.C.1 • 9.2

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		<p>range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future.</p> <ul style="list-style-type: none">• Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart.			
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		<ul style="list-style-type: none"> Water's movements— both on the land and underground— cause weathering and erosion, which change the land's surface features and create underground formations. 			
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Unit/ Duration	Essential Questions	Content	Skills	Assessment	Standards
Unit 8: Plate Tectonics 3 Weeks	<ul style="list-style-type: none"> Have the Earth's continents always looked the way they do today? What causes Earth's 	<ul style="list-style-type: none"> The geologic time scale interpreted from rock strata provides a way to organize Earth's history. Analyses of rock strata and the fossil record 	<ul style="list-style-type: none"> Explain how fossil records provide scientists with evidence of continental drift and Pangaea. Relate the convection 	<ul style="list-style-type: none"> Formative Assessment Various Lab Activities Quizzes Tests 	<ul style="list-style-type: none"> SCI.MS-ESS2-2 SCI.MS-ESS2-3 SCI.MS-ESS2-1 LA.6-8.CCSS.ELA-Literacy.RST.6-8.1 LA.6-8.CCSS.ELA-Literacy.RST.6-8.7 LA.6-8.CCSS.ELA-Literacy.RST.6-8.9

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	<p>continents to move?</p> <ul style="list-style-type: none"> • In what ways do Earth's plates interact? What happens at these plate boundaries? • What causes earthquakes, tsunamis and volcanoes? 	<p>provide only relative dates, not an absolute scale.</p> <ul style="list-style-type: none"> • Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches. • The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history 	<p>currents in the mantle to the motion of the tectonic plates on the surface.</p> <ul style="list-style-type: none"> • Identify the three types of plate boundaries and explain how plate interactions reshape Earth's surface. 		<ul style="list-style-type: none"> • LA.6-8.CCSS.ELA-Literacy.WHST.6-8.2 • LA.6-8.CCSS.ELA-Literacy.WHST.6-8.8 • LA.8.CCSS.ELA-Literacy.SL.8.5 • 8.1.8.B.1 • 8.1.8.C.1 • 9.2
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		<p>and will determine its future.</p> <ul style="list-style-type: none">• Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart.• Water's movements—both on the land and underground—cause weathering and erosion, which change the land's surface features and create			
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		underground formations.			
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Unit/ Duration	Essential Questions	Content	Skills	Assessment	Standards
Unit 9: Human Impact 5 Weeks	<ul style="list-style-type: none"> How can natural hazards be predicted? How do human activities affect Earth systems? 	<ul style="list-style-type: none"> Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events. Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the 	<ul style="list-style-type: none"> Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. Construct an argument supported by evidence for 	<ul style="list-style-type: none"> Formative Assessment Various Lab Activities Quizzes Tests 	<ul style="list-style-type: none"> LA.6-8.CCSS.ELA-Literacy.RST.6-8.1 LA.6-8.CCSS.ELA-Literacy.RST.6-8.7 SCI.MS-ESS3 LA.6-8.CCSS.ELA-Literacy.WHST.6-8.1 LA.6-8.CCSS.ELA-Literacy.WHST.6-8.7 LA.6-8.CCSS.ELA-Literacy.WHST.6-8.8 SCI.MS-ESS3-2 SCI.MS-ESS3-4 SCI.MS-ESS3-3 8.1.8.B.1 8.1.8.C.1 8.1.8.E.1 8.2.8.B.7 9.2

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		<p>extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things.</p> <ul style="list-style-type: none">• 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.	<p>how increases in human population and per-capita consumption of natural resources impact Earth's systems.</p>		
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