Overview of Year

___7____ Grade _____Science_____ Curriculum

SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
Physical Science					Life Science				
Unit 1: Geology				Unit 2: Meteorology		Unit 3: Genetics		Unit 4: Evolution	

Unit : Geology

Transfer Goal:	**Essential question:** How has Rochester changed over time?
Present day evidence gives us clues about the past which will be demonstrated by a trip to the Genesee Gorge where students will analyze rock formations and collect rock samples to map the geologic history of Rochester over time.	

Standards:	**Understandings:**
2.1 c The rock at Earth's surface forms a nearly continuous shell around Earth called the lithosphere. 2.1e Rocks are composed of minerals. Only a few rock-forming minerals make up most of the rocks of Earth. Minerals are identified on the basis of physical properties such as streak, hardness, and reaction to acid. 2.1g The dynamic processes that wear away Earth's surface include weathering and erosion. 2.1h The process of weathering breaks down rocks to form sediment. Soil consists of sediment, organic material, water, and air. 2.1i Erosion is the transport of sediment. Gravity is the driving force behind erosion. Gravity can act directly or through agents such as moving water, wind, and glaciers. 2.2a The interior of Earth is hot. Heat flow and movement of material within Earth cause sections of Earth's crust to move. This may result in earthquakes, volcanic eruption, and the creation of mountains and ocean basins. 2.2g Rocks are classified according to their method of formation. The three classes of rocks are sedimentary, metamorphic, and igneous. Most rocks show characteristics that give clues to their formation conditions. 2.2h The rock cycle model shows how types of rock or rock material may be transformed from one type of rock to another.	Density drives the movement and change in Earth's interior which causes change in geologic formations. Describe and/or explain how rocks or rock materials may be transformed from one rock to another.

3.1a Substances have characteristic properties. Some of these properties include color, odor, phase at room temperature, density, solubility, heat and electrical conductivity, hardness, and boiling and freezing points. 3.1h Density can be described as the amount of matter that is in a given amount of space. If two objects have equal volume, but one has more mass, the one with more mass is denser. 2.1c The rock at Earth's surface forms a nearly continuous shell around Earth called the lithosphere. 2.1e Rocks are composed of minerals. Only a few rock-forming minerals make up most of the rocks of Earth. Minerals are identified on the basis of physical properties such as streak, hardness, and reaction to acid. 2.1f Fossils are usually found in sedimentary rocks. Fossils can be used to study past climates and environments. 2.2a The interior of Earth is hot. Heat flow and movement of material within Earth cause sections of Earth's crust to move. This may result in earthquakes, volcanic eruption, and the creation of mountains and ocean basins. 2.2b Analysis of earthquake wave data (vibrational disturbances) leads to the conclusion that there are layers within Earth. These layers—the crust, mantle, outer core, and inner core—have distinct properties. 2.2c Folded, tilted, faulted, and displaced rock layers suggest past crustal movement. 2.2d Continents fitting together like puzzle parts and fossil correlations provided initial evidence that continents were once together. 2.2e The Theory of Plate Tectonics explains how the "solid" lithosphere consists of a series of plates that "float" on the partially molten section of the mantle. Convection cells within the mantle may be the driving force for the movement of the plates. 2.2f Plates may collide, move apart, or slide past one another. Most volcanic activity and mountain building occur at the boundaries of these plates, often resulting in earthquakes. 2.2g Rocks are classified according to their method of formation. The three classes of rocks are sedimentary, metamorphic, and igneous. Most rocks show characteristics that give clues to their formation conditions. 2.2h The rock cycle model shows how types of rock or rock material may be transformed from one type of rock to another.		
Performance Task: Field study analyzing rock formations and collecting rock samples at the Genesee Gorge to provide evidence		**Criteria for performance task:** Students will be able to explain how density drives the movement and change in Earth's interior which

that supports Rochester was once underwater and has changed over time.	causes change in geologic formations and describe and/or explain how rocks or rock materials may be transformed from one rock to another through a field study at the Genesee Gorge to provide evidence that supports Rochester was once underwater and has changed over time. ● Density = greater density sinks because molecules are packed tighter ● Earth is composed of 4 layers which are arranged by differences in density = inner core, outer core, mantle, crust ● The crust (the outermost layer of the earth) is a part of the lithosphere which is broken into plates and floats on the mantle ● The continents (each a part of a plate) used to be one supercontinent, Pangaea. ● There are 4 pieces of evidence that support Pangaea: fossil evidence, mountain ranges, coastlines, and rock layers. ● The three rock types are classified by their method of formation and are constantly changing. ● Convection currents in the mantle cause crustal plates to move causing different geologic formations and rock types. ● Sedimentary rocks are formed by weathering, erosion, and deposition.

Unit : Meteorology	
Transfer Goal: Students will understand that changes in the atmosphere provide evidence to predict future weather patterns demonstrated by analyzing weather maps and accurately predicting a weather forecast.	**Essential question:** How does weather in Rochester change over time and how do we know?

Standards: 2.1a Nearly all the atmosphere is confined to a thin shell surrounding Earth. The atmosphere is a mixture of gases, including nitrogen and oxygen with small amounts of water vapor, carbon dioxide, and other trace gases. The atmosphere is stratified into layers, each having distinct properties. Nearly all weather occurs in the lowest layer of the atmosphere. 2.1b As altitude increases, air pressure decreases. 2.1j Water circulates through the atmosphere, lithosphere, and hydrosphere in what is known as the water cycle. 2.2i Weather describes the conditions of the atmosphere at a given location for a short period of time. 2.2j Climate is the characteristic weather that prevails from season to season and year to year. 2.2k The uneven heating of Earth's surface is the cause of weather. 2.2l Air masses form when air remains nearly stationary over a large section of Earth's surface and takes on the conditions of temperature and humidity from that location. Weather conditions at a location are determined primarily by temperature, humidity, and pressure of air masses over that location. 2.2n The movement of air masses is determined by prevailing winds and upper air currents. 2.2o Fronts are boundaries between air masses. Precipitation is likely to occur at these boundaries. 2.2p High-pressure systems generally bring fair weather. Low-pressure systems usually bring cloudy, unstable conditions. The general movement of highs and lows is from west to east across the United States. 2.2q Hazardous weather conditions include thunderstorms, tornadoes, hurricanes, ice storms, and blizzards. Humans can prepare for and respond to these conditions if given sufficient warning. 2.2r Substances enter the atmosphere naturally and from human activity. Some of these substances include dust from volcanic eruptions and greenhouse gases such as carbon dioxide, methane, and water vapor. These substances can affect weather, climate, and living things.	**Understandings:** The atmosphere is in layers based on other physical properties like density and humidity The movement of air from regions of high to low pressure produces the formation of fronts which causes predictable changes in weather.
Performance Task: Weather forecast project in which students analyze weather maps, create a skit for a weather forecast, and accurately predict the weather forecast through a presentation.	**Criteria for performance task:** Students will be able to explain how the movement of air from regions of high to low pressure produces the formation of fronts which causes predictable changes in weather through a rubric driven weather forecast project in which students analyze weather

	maps, create a skit for a weather forecast, and accurately predict the weather forecast through a presentation. ● Students will be able to explain how the movement of air from regions of high to low pressure produces the formation of fronts which causes predictable changes in weather through a rubric driven weather forecast project in which students analyze weather maps, create a skit for a weather forecast, and accurately predict the weather forecast through a presentation. ● Air masses take on the conditions of temperature and humidity from that location. ● Different types of precipitation occur at fronts and you can use fronts to predict future weather ● High pressure systems = dry, sunny weather ● Low pressure systems = cloudy, wet weather

Unit : Genetics

Transfer Goal:	**Essential question:**
Students will understand that genetic information is passed from generation to generation and physical appearance is determined by the combination of genes from each parent demonstrated by a project where students will determine possible outcomes of genetic crosses.	What makes something alive? How are offspring with the same parents different?

Standards:	**Understandings:**
1.1a Living things are composed of cells. Cells provide structure and carry on major functions to sustain life. Cells are usually microscopic in size. 1.1b The way in which cells function is similar in all living things. Cells grow and divide, producing more cells. Cells take in nutrients, which they use to provide energy for the work that cells do and to make the materials that a cell or an organism needs. 1.1c Most cells have cell membranes, genetic	Cells are the basic structure and function of life. Organisms reproduce sexually to provide variation within a species. Genetic information is passed from generation to generation.

material, and cytoplasm. Some cells have a cell wall and/or chloroplasts. Many cells have a nucleus. 1.1d Some organisms are single cells; others, including humans, are multicellular. 4.1a Some organisms reproduce asexually. Other organisms reproduce sexually. Some organisms can reproduce both sexually and asexually. 4.1b There are many methods of asexual reproduction, including division of a cell into two cells, or separation of part of an animal or plant from the parent, resulting in the growth of another individual. 4.1c Methods of sexual reproduction depend upon the species. All methods involve the merging of sex cells to begin the development of a new individual. In many species, including plants and humans, eggs and sperm are produced. 4.2a The male sex cell is the sperm. The female sex cell is the egg. The fertilization of an egg by a sperm results in a fertilized egg. 4.2b In sexual reproduction, sperm and egg each carry one-half of the genetic information for the new individual. Therefore, the fertilized egg contains genetic information from each parent. 4.3a Multicellular organisms exhibit complex changes in development, which begin after fertilization. The fertilized egg undergoes numerous cellular divisions that will result in a multicellular organism, with each cell having identical genetic information. 4.3b In humans, the fertilized egg grows into tissue which develops into organs and organ systems before birth. 4.4a In multicellular organisms, cell division is responsible for growth, maintenance, and repair. In some one-celled organisms, cell division is a method of asexual reproduction. 4.4b In one type of cell division, chromosomes are duplicated and then separated into two identical and complete sets to be passed to each of the two resulting cells. In this type of cell division, the hereditary information is identical in all the cells that result. 4.4d Cancers are a result of abnormal cell division. 2.1a Hereditary information is contained in genes. Genes are composed of DNA that makes up the chromosomes of cells. 2.1c Each human cell contains a copy of all the genes needed to produce a human being. 2.1d In asexual reproduction, all the genes come from a single parent. Asexually produced offspring are genetically identical to the parent. 2.1e In sexual reproduction typically half of the	

genes come from each parent. Sexually produced offspring are not identical to either parent. 2.2a In all organisms, genetic traits are passed on from generation to generation. 2.2b Some genes are dominant and some are recessive. Some traits are inherited by mechanisms other than dominance and recessiveness. 2.2c The probability of traits being expressed can be determined using models of genetic inheritance. Some models of prediction are pedigree charts and Punnett squares.	
Performance Task: Genetic crossing project in which students combine genes from two parents to predict the possible genetic outcome for the child. Students will use the genetic information to determine the physical appearance of the offspring.	**Criteria for performance task:** Students will be able to explain how organisms reproduce sexually to provide variation within a species and how genetic information is passed from generation to generation through a rubric driven genetic crossing project in which students combine genes from two parents to predict the possible outcomes for the child. ● Students will be able to explain how genetic information is passed from generation to generation and physical appearance is determined by the combination of genes from each parent demonstrated by a project where students will determine possible outcomes of genetic crosses. ● Two types of reproduction (Asexual and Sexual) ● Sex cells carry ½ genetic information ● Genes are passed from generation to generation ● Dominant vs. recessive traits ● Models to express probability of passing traits

Unit : Evolution	
Transfer Goal: Students will understand why organisms with certain traits are more likely to survive in a given environment demonstrated by creating a map outlining the migration and evolution of humans in conjunction with the “Out of Africa” theory.	**Essential question:** How do differences drive change? Race: Are we really so different?
Standards: 3.1a The processes of sexual reproduction and mutation have given rise to a variety of traits within a species. 3.1b Changes in environmental conditions can affect the survival of individual organisms with a particular trait. Small differences between parents	**Understandings:** Environmental changes can cause evolution/extinction. Organisms with the “most fit” trait will be more likely to survive in a given environment.

and offspring can accumulate in successive generations so that descendants are very different from their ancestors. Individual organisms with certain traits are more likely to survive and have offspring than individuals without those traits. 3.2a In all environments, organisms with similar needs may compete with one another for resources. 3.2b Extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient to permit its survival. Extinction of species is common. Fossils are evidence that a great variety of species existed in the past. 3.2c Many thousands of layers of sedimentary rock provide evidence for the long history of Earth and for the long history of changing life forms whose remains are found in the rocks. Recently deposited rock layers are more likely to contain fossils resembling existing species.	

Performance Task: Creation of a map outlining the migration and evolution of humans in conjunction with the "Out of Africa Theory". Students will make connections between climate and traits of the individuals who migrated to specific areas throughout the globe.	**Criteria for performance task:** Students will be able to explain how environmental change can cause evolution and how organisms with the "most fit" trait will be more likely to survive in a given environment through a rubric driven map project in which they outline the migration and evolution of humans.