North Carolina Science

Essential Standards

Public Schools of Robeson County

7th Grade Science Unit Plans

2020-2021

Unit Analysis

The Public Schools of Robeson County Unit Analyses is intended to guide instruction and ensure that all concepts and skills from the North Carolina Standard Course of Study are taught and implemented during the instructional year. It is expected that the Unit Analyses are followed in order of the general timeline. These standards were grouped into units of study so that teachers will embed several standards into a lesson, rather than teaching each concept in isolation. This grouping of standards supports a balanced literacy model of teaching. In order to fully teach the North Carolina Standard Course of Study, it is expected that teachers plan for and implement daily use of the new curriculum documents developed by the teachers in their field with the guidance from the Scotland County Curriculum Specialists. These standards identify areas of proficiency that all students should achieve throughout the year.

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| **7th Grade Essential Standards Pacing Guide** |
| Textbook:  |
| **Units:** Topics**Clarifying Objective** | **Number of Days** |
| [**Unit 1:** **Introduction to Science and Process Skills**](#31s9gpcpo596) Ice Breaker Lab Safety Scientific Method | 2 |
| [**Unit 2: Weather, Atmosphere, and Climate**](#xmuu0nabt9wn)[7.Ec1.1](#fu0n9lca0e11) Compare the composition, properties, and structures of the Earth’s atmosphere to include mixtures of gases and differences in temperature with layers[7.E.1.2](#mbzxchqbv78o) Explain how the cycling of water in and out of the atmosphere and atmospheric conditions relate to the weather patterns on Earth[7.E.1.3](#mbzxchqbv78o) Explain the relationship between the movement of air masses, high and low pressure systems, and frontal boundaries to storms (including thunderstorms, hurricanes, and tornadoes) and other weather conditions that may result[7.E.1.4](#r6ipgorw6qnf) Predict weather conditions and patterns based on information obtained from: Weather data collected from direct observations and measurement (wind speed and direction, air temperature, humidity, and air pressure). Weather maps, satellites, and radars. Cloud shapes and types associated with elevation[7.E.1.5](#ma6qtnncjlw4) Explain the influence of convection, global winds, and the jet stream on weather and climatic conditions[7.E.1.6](#ycoth7evbn2v) Conclude that the good health of humans requires monitoring the atmosphere, maintaining air quality, and stewardship  | 41 |
| [**Unit 3: Structures and Functions of Living Organisms**](#du7m6jnewi19)[7.L.1.1](#nx6fhio2sv55) Compare the structures and life functions of single-celled organisms that carry out all of the basic functions of life including: Euglena, Amoeba, Paramecium, and Volvox[7.1.2](#wjic248yleyg) Compare the structures and functions of plant and animal cells, including major organelles (cell membrane, cell wall, nucleus, chloroplasts, mitochondria, and vacuoles)[7.L.1.3](#af718qcpkc0s) Summarize the hierarchical organization of multicellular organisms from cells to tissues to organs to systems to organisms | 15 |
| [**Unit 4 : Human Body**](#8eaw7ovsbru3)7.L.1.4 Summarize the general functions of the major systems of the human body (digestive, respiratory, reproductive, circulatory, and excretory) and ways that these systems interact with each other to sustain life | 31 |
| [**Unit 5 : Genetics**](#1je6ec7keshz)[7.L.2.1](#83464rj1om89) Explain why offspring that result from sexual reproduction (fertilization and meiosis) have greater variation than offspring that result from asexual reproduction (budding and mitosis)[7.L.2.2](#ehjsv57nlur5) Infer patterns of heredity using information from Punnet Squares and pedigree analysis[7.L.2.3](#ehjsv57nlur5) Explain the impact of the environment and lifestyle choices on biological inheritance (to include common genetic diseases) and survival | 23 |
| [**Unit 6: Motion and Forces**](#s1pkydfdpa0k)[7.P.1.1](#33tshswvdjqe) Explain how the motion of an object can be described by its position, direction of motion, and speed with respect to some other object[7.P.1.2](#33tshswvdjqe) Explain the effects of balanced and unbalanced forces acting on an object (including friction, gravity, and magnets) [7.P.1.3](#33tshswvdjqe) Illustrate the motion of an object using a graph to show a change in position over a period of time[7.P.1.4](#33tshswvdjqe) Interpret distance versus time graphs for constant speed and variable motion  | 19 |
| [**Unit 7: Conservation of Energy**](#trfjx8bqcd7q)[7.P2.1](#goate5prqny1) Explain how kinetic and potential energy contribute to the mechanical energy of an object[7.P.2.2](#goate5prqny1) Explain how energy can be transformed from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples)[7.P. 2.3](#goate5prqny1) Explain how energy can be transferred from one system to another when two objects push or pull on each other over a distance (work) and electrical circuits require a complete loop through which an electrical current can pass[7.P.2.4](#o1mcf4h8dhvv) Explain how simple machines such as inclined planes, pulleys, levers, and wheels and axles are used to create mechanical advantage and increase efficiency | 19 |
| **Review, Remediate, Test** | 29 |

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| **Public Schools of Robeson County****7TH Grade Science Curriculum Unit 1****Science as Inquiry** | **Strand: Inquiry****Clarifying Objective: Science as Inquiry** **Days: 2** **Dates: Aug. 17th –Aug. 19th and embedded throughout the year** |

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| **Essential Standard** |
| Science Inquiry |
| **Clarifying Objectives** |
| Lab Process Skills |
| **Essential Questions** | **Students Will Know:** |
| How do students remain safe in the laboratory environment?What is the proper way to use and care for lab equipment?How should students use and apply the scientific method? | * Know the correct procedures for setting up, breaking down labs, and the correct tools to use
* Understand the importance of following proper lab safety procedures
* Know how to implement the scientific method
* Know the proper way to complete a lab report
* Know proper scientific terminology and process skills
 |
| **Students Will Be Able To:** |
| * Lab safety contract with parent and student signatures
* Demonstrate comprehension of lab safety rules
* Apply the scientific method
* Properly use lab equipment
* Demonstrate safe lab practices

\**By the end of the year, students should be able to design their own experiment to answer questions and solve problems. Learning experimental design is an ongoing process.* |
| **Graphic Organizer** |
| <https://my.hrw.com/nsmedia/intgos/html/igo.htm><https://gettingnerdywithmelandgerdy.com/wp-content/uploads/2015/09/8668854_orig2.jpg><http://www.carolina.com/images/teacher-resources/infographics/lab-safety.jpg><https://s3.amazonaws.com/user-content.enotes.com/081c0f0c5c3d7a647020b957b26d09eecd9c7fc2.png><https://duckingsciencebombs.files.wordpress.com/2013/09/scientific-model.jpg> |
| **Assessments/Probes** |
| **Formative Assessment**Bell work[Science Assessment Probes](https://drive.google.com/drive/search?q=Science%20Assessment%20probes) Volume 3Is it a Theory? Pages 83-91Doing Science Pages 93-100What is a Hypothesis? Pages 101-108Volume 4Is it a Model? Pages 93-100 | **Summative Assessment**Teacher made quizLab of teachers choiceDiagramming and Labeling |
| **Vocabulary** |
| List of lab equipment appropriate for your grade/strandTerms from the lab safety contract used within your schoolUnits of the metric system | * Hypothesis
* Qualitative Observation
* Quantitative Observation
* Procedure
* Independent Variable
* Dependent Variable
* Constant
* Inference
* Conclusion
 |
| **Resources** |
| Lab Safety ContractMr. Lee’s Scientific Method Rap (Youtube)Video on lab safety and/or the scientific methodLab equipment and metric measure toolsSMART board and other SMART equipment[www.sciencespot.net](http://www.sciencespot.net) (Sponge Bob Safety)[www.middleschoolscience.com](http://www.middleschoolscience.com) (observation/inference)Quizlet |

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| **Public Schools of Robeson County****7TH Grade Science Curriculum** **Unit 2****Atmosphere/Weather/Climate** | **Strand: Earth Science** **Clarifying Objective: 7.E.1.1** **Days: 9** **Dates: Aug. 20 - Sept 1**  |

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| **Essential Standard** | **Clarifying Objectives** |
| **7.E.1** Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth’s atmosphere, weather, and climate | **7.E.1.1** Compare the composition, properties, and structure of Earth’s atmosphere to include: mixture of gases and difference in temperature and pressure within layers |
| **Literacy Standards** |
| **Reading Standard**: **RI 7.1:** Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. **RI 7.4:** Determine the meaning of words and phrases as they are used in a text **Writing Standard**: **W.7.1:** Write arguments to support claims with clear reasons and relevant evidence.**W.7.2:** Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.**W.7.6:** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. |
| **Technology Standards** |
| **7.TT.1.1** – Use appropriate technology tools and other resources to access information. **7.TT.1.2** – Use appropriate technology tools and other resources to organize information (e.g. graphic organizers, databases, spreadsheets, and desktop publishing). |
| **Suggested Essential Questions** |
| * what evidence proves that air is not a single gas, but rather a mixture of different gases?
* how do the layers of the atmosphere compare to each other?
 |
| **Students Will Be Able To:** | **Students Will Know:** |
| * Describe the composition of the atmosphere
* Differentiate between the layers of the atmosphere based on the properties and man-made objects in each layer
* Analyze the relationship between altitude and air pressure
* Explain how the atmosphere maintains equilibrium
 | * Mixture of gases that make up the atmosphere
* Man-made objects in different atmospheric layers
* properties of each layer
* relationship between altitude and air pressure
* Equilibrium
 |
| **Graphic Organizer** |
| https://my.hrw.com/nsmedia/intgos/html/igo.htm |
| **Assessments/Probes** |
| **Formative Assessment**Bell WorkModel of atmospheric layers with propertiesIllustrations/posters[Science Assessment Probe](https://drive.google.com/drive/search?q=Science%20Assessment%20probes)Volume 1Is it Melting? Pages 73-77Wet Jeans Pages 155-161Mitten Problem Pages 103-108Objects and Temperature Pages 109-114Volume 2Floating Logs Pages 27-32Floating High and Low Pages 33-39Solids and Holes Pages 41-46What’s in the Bubbles? Pages 65-70Volume 3Floating Balloons Pages 39-44Hot and Cold Balloons Pages 45-50What are Clouds Made of? Pages 155-161Where did the Water Come From? Pages 163-169Rain Fall Pages 171-176 | **Summative Assessment**Teacher made assessmentsQuizzes ProjectDiagramming and labeling |
| **Vocabulary** |
| * Troposphere
* Stratosphere
* Thermosphere
* Mesosphere
* Ionosphere
* Satellites
* Ozone
 | * Barometer
* Altitude
* Elevation
* Exosphere
* Density
* Probes
* Ozone layer
 |
| **Resources** |
| Mr. Lee’s Layers of the Atmosphere Rap (Youtube)SMART exchange and other SMART resourcesNASA and NOAA websites<http://weather.weaterbug.com/><http://www.srh.noaa.gov/jetstream//matrix.htm><http://weather.unisys.com/> Quizlet |
| **Vertical Alignment**EEn.2.5.1 Summarize the structure and composition of our atmosphere |
| **Unpacking:****7.E.1.1:** The earth has a variety of climates, defined by average temperature, precipitation, humidity, air pressure, and wind, over time in a particular place. The atmosphere is a mixture of gases, such as nitrogen (78%), oxygen (21%), argon (0.93%), carbon dioxide (0.04%), trace gases and water vapor. The amount of each gas in the mixture is usually very constant from the surface of the planet up to the top of the troposphere. These gases are constantly being used and renewed by the processes of respiration, photosynthesis, evaporation and condensation, the weathering of rock, and the decay of organic matter. The atmosphere has different properties at different elevations and different locations around the Earth. Air pressure, also known as atmospheric pressure, refers to the weight of the Earth’s atmosphere pressing down on everything at the surface. Air pressure varies slightly over the Earth’s surface, and variations in pressure are responsible for the weather. Low pressure is associated with storms, tornadoes, and hurricanes. High pressure is associated with clear and dry conditions. The air pressure is less on the top of mountains (higher elevation) than in valleys. At the equator the atmosphere is warmer; at the poles it is cooler. The uneven heating of land and water causes a rising and sinking of warm and cool air masses creating convection currents and causes winds. Five layers make up the atmosphere: the troposphere, stratosphere, mesosphere, thermosphere, and exosphere. Each of these layers has very unique properties. Weather occurs in the troposphere and is the physical condition of the atmosphere at a specific place at a specific time. Fronts, global wind systems, atmospheric pressure changes and many other factors influence the weather. Major atmospheric activities such as thunderstorms, tornadoes and hurricanes affect humans and can result in huge natural disasters. Air has weight. Air molecules are in constant motion and are affected by gravity. The force of this movement causes air pressure. Air pressure changes with elevation. As you move up into the atmosphere, the air molecules are further apart. So, air pressure decreases as distance above the surface increases. Air pressure also decreases as the amount of water vapor in the air goes up. Since warm air is less dense than cool air, when temperatures are higher, the air pressure is usually lower. Air pressure is measured with a mercury barometer (mm of mercury) or and aneroid barometer ( millibars-mb). The atmosphere has constant change but strives to maintain equilibrium.  |

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| **Public Schools of Robeson County****7TH Grade Science Curriculum Unit 6****Atmosphere/Weather/Climate** | **Strand: Earth Science** **Clarifying Objective: 7.E.1.2 1.3** **Days: 11** **Dates: Sept. 2 - Sept. 17**  |

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| **Essential Standard** | **Clarifying Objectives** |
| **7.E.1** Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth’s atmosphere, weather, and climate | **7.E.1.2** Explain how the cycling of water in and out of the atmosphere and atmospheric conditions relate to weather patterns on Earth**7.E.1.3** Explain the relationship between the movement of air masses, high and low pressure systems, and frontal boundaries to storms (including thunderstorms, hurricanes, and tornadoes) and other weather conditions that may result |
| **Literacy Standards** |
| **Reading Standard**:**RI 7.1:** Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. **RI 7.4:** Determine the meaning of words and phrases as they are used in a text**Writing Standard**: **W.7.1:** Write arguments to support claims with clear reasons and relevant evidence.**W.7.2:** Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.**W.7.6:** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. |
| **Technology Standards** |
| **7.SI.1.3** – Evaluate resources for point of view, bias, values, or intent of information.  |
| **Essential Questions** |
| * What conjectures can you make about the relationship between the water cycle and weather patterns?
* How do differences in local and global weather conditions, including frontal boundaries, work together to form different weather conditions?
 |
| **Students Will Be Able To:** | **Students Will Know:** |
| * Identify how water cycling through the atmosphere provides the moisture needed for weather events
* Analyze the movement of air masses based on pressure differences
* Compare and contrast the characteristics of the different types of frontal boundaries
* Evaluate patterns in atmospheric conditions that lead to the development of major weather events
 | * The movement of water through the atmosphere
* Air will always flow from high pressure to low pressure
* Characteristics of frontal boundaries
* Characteristics of severe weather
 |
| **Graphic Organizer** |
| https://my.hrw.com/nsmedia/intgos/html/igo.htm |
| **Assessments/Probes** |
| **Formative Assessment**Bell Work **Formative Assessment**Bell WorkModel of atmospheric layers with propertiesIllustrations/posters[Science Assessment Probe](https://drive.google.com/drive/search?q=Science%20Assessment%20probes)Volume 1Is it Melting? Pages 73-77Wet Jeans Pages 155-161Mitten Problem Pages 103-108Objects and Temperature Pages 109-114Volume 2Floating Logs Pages 27-32Floating High and Low Pages 33-39Solids and Holes Pages 41-46What’s in the Bubbles? Pages 65-70Volume 3Floating Balloons Pages 39-44Hot and Cold Balloons Pages 45-50What are Clouds Made of? Pages 155-161Where did the Water Come From? Pages 163-169Rain Fall Pages 171-176 | **Summative Assessment**Teacher made assessmentsQuizzesDiagramming and labeling |
| **Vocabulary** |
| * Evaporation
* Condensation
* Precipitation
* Run-off
* Transpiration
* Percolation
* Ground water
* Cycle
* Sleet
* Snow
* Freezing rain
* Radiation
* Conduction
* Convection
* Rain
* Hail
 | * Tornadoes
* Hurricanes
* Floods
* Dew point
* Thunder
* Lightening
* Fog
* Tropical storm
* Tropical depression
* Blizzards
* Winter storms
* Relative humidity
* Warm front
* Cold front
* Stationary front
 |
| **Resources** |
| SMART technology materialsNASA and NOAA<http://weather.weaterbug.com/><http://www.srh.noaa.gov/jetstream//matrix.htm><http://weather.unisys.com/> <http://www.weather.com/> (The Weather Channel)<http://www.wral.com/weather/> (Doppler 5000 and iControl Doppler)Quizlet |
| **Vertical Alignment**5.E.1 Understand weather patterns and phenomena, making connections to the weather in a particular place and timeEEn.2.5 Understand the structure of processes within our atmosphere |
| **Unpacking:** **7.E.1.2**  Water evaporates from the surface of the earth, rises and cools, condenses into rain or snow, and falls again to the surface. The water falling on land collects in rivers and lakes, soil, and porous layers of rock, and much of it flows back into the oceans. The cycling of water in and out of the atmosphere is a significant aspect of the weather patterns on Earth. Sunlight provides the energy that evaporates water from the surface of Earth. Some of the water vapor comes from the continents, but most comes from the oceans. Winds carry the water vapor from the ocean over the continents. Part of the water vapor condenses into clouds, then falls as rain or snow. Some of the rain returns to the ocean from rivers and streams as runoff. Some seeps into the ground to become groundwater. Some returns to the air by evaporation from the ground or by transpiration from plant leaves. When runoff from the continents returns to the ocean, one turn of the water cycle is completed. Other routes are possible. For example, water that evaporates from the ocean can return to the ocean as rain. The water cycle never ends. The salt water of the ocean supplies fresh water to the continents over and over again. Weather is the state of the atmosphere at a given time and place. A complete description of the weather includes the amount and type of clouds. Rain, snow, thunderstorms, lightning, and even dust storms are part of the weather. Measurements of temperature, air pressure, wind speed and direction, and the amount of moisture in the air are also included in a description of the weather. Weather is studied and predicted by scientists called Meteorologists. The science of meteorology is the study of the entire atmosphere, including the weather. To understand and predict the weather, meteorologist must first understand how the atmosphere heats and cools, how clouds form and produce rain, and what makes the wind blow. **7.E.1.3:** An air mass is a large section of the lower troposphere that has the same weather throughout. Air masses can form over continents, icecaps or the ocean. Air masses are controlled by patterns of heating and cooling over large areas of the Earth’s surface. Changes in air pressure readings indicate the passing of high and low pressure systems. Differences in air pressure cause Earth’s winds and weather changes. Storms are natural disturbances in the atmosphere that involve air pressure, clouds, precipitation, and strong winds. The major types of storms are thunderstorms, hurricanes, tornadoes, and winter storms. Each type has its own characteristics and dangers. Tornadoes are violently whirling winds sometimes visible as a funnel-shaped cloud. They are produced by severe thunderstorms. Spiraling high winds and extremely low pressure are the unique features of tornadoes. Thunderstorms are known as electrical storms. A thunderstorm is characterized by the presence of lightning and thunder. They are produced rapidly when rising air causes cumulus clouds to build upward into a thunderhead. The cloud type associated with thunderstorms are cumulonimbus. Thunderstorms are usually accompanied by strong winds, heavy rain and sometimes snow, hail or no precipitation at all. Thunderstorms are brief, intense storms that affect a small area. Hurricanes are huge, rotating storms that form over the ocean near the equator. They produce very strong winds, heavy rains, and large, powerful waves and can cause severe flooding and damage from strong winds. Floods occur when an area is inundated with water. Weather related flooding is most often associated with hurricanes and thunderstorms. Winter storms are associated with quickly moving cold fronts and they can produce high winds, very low temperatures plus include blizzards, ice storms and large accumulations of snow.  |

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| **Public Schools of Robeson County****7TH Grade Science Curriculum Unit 2****Atmosphere/Weather/Climate** | **Strand: Earth Science****Clarifying Objective: 7.E.1.4****Days: 11** **Dates: Sept. 18 - Oct. 2**  |

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| **Essential Standard** | **Clarifying Objectives** |
| **7.E.1** Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth’s atmosphere, weather, and climate | **7.E.1.4** Predict weather conditions and patterns based on information obtained from:* Weather data collected from direct observations and measurement (wind speed and direction, air temperature, humidity, and air pressure)
* Weather maps, satellites, and radar
* Cloud shapes and types associated with elevation
 |
| **Literacy Standard** |
| **Reading Standard**: **RI 7.4:** Determine the meaning of words and phrases as they are used in a text**Writing Standard**: **W.7.6:** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. |
| **Technology Standards** |
| **7.SE.1.2** – Evaluate content for relevance to the assigned task. **7.TT.1.1** – Use appropriate technology tools and other resources to access information. **7.TT.1.2** – Use appropriate technology tools and other resources to organize information (e.g. graphic organizers, databases, spreadsheets, and desktop publishing). |
| **Essential Questions** |
| * Which atmospheric condition is most useful in predicting future weather conditions? Justify your answer.
* Which type of technology is most useful in predicting future weather conditions? Justify your answer.
* **How can weather data be used to predict future weather conditions?**
 |
| **Students Will Be Able To:** | **Students Will Know:** |
| * Identify weather conditions and collect measurements based upon direct observations
* Analyze data from weather maps, satellites, and radars to predict weather conditions
* Develop a forecast based upon weather conditions tracked or monitored over time including cloud type/height and weather events
 | * Types of tools used for collecting weather observations
* Weather station and map symbols
* Cloud types and height
 |
| **Graphic Organizer** |
| https://my.hrw.com/nsmedia/intgos/html/igo.htm |
| **Assessments/Probes** |
| **Formative Assessment**Bell WorkModel of atmospheric layers with propertiesIllustrations/posters[Science Assessment Probe](https://drive.google.com/drive/search?q=Science%20Assessment%20probes)Volume 1Is it Melting? Pages 73-77Wet Jeans Pages 155-161Mitten Problem Pages 103-108Objects and Temperature Pages 109-114Volume 2Floating Logs Pages 27-32Floating High and Low Pages 33-39Solids and Holes Pages 41-46What’s in the Bubbles? Pages 65-70Volume 3Floating Balloons Pages 39-44Hot and Cold Balloons Pages 45-50What are Clouds Made of? Pages 155-161Where did the Water Come From? Pages 163-169Rain Fall Pages 171-176 | **Summative Assessment**Teacher made assessmentsQuizzesDiagramming and labeling |
| **Vocabulary** |
| * Aurora Borealis
* Aurora Australis
* Stratus
* Cumulus
* Cirrus
* Contour lines
* Wind speed
 | * Wind Direction
* Cloud Coverage
* Barometric Pressure
* Weather Satellites
* Doppler Radar
* Forecast
* Meteorologist
 |
| **Resources** |
| Weather maps from local newspapers or other locationsProfessional meteorologistsSM ART Technologies<http://weather.weaterbug.com/><http://www.srh.noaa.gov/jetstream//matrix.htm><http://weather.unisys.com/> <http://www.weather.com/> (The Weather Channel)<http://www.wral.com/weather/> (Doppler 5000 and iControl Doppler)Quizlet |
| **Vertical Alignment**5.E.1 Understand weather patterns and phenomena, making connections to the weather in a particular place and timeEEn.2.5 Understand the structure of processes within our atmosphereEEn.2.6 Analyze patterns of global climate change over time |
| **Unpacking:** **7.E.1.4:** The earth has a variety of climates, defined by average temperature, precipitation, humidity, air pressure, and wind, over time in a particular place. Weather forecasting is an attempt to make accurate predictions of future weather. The accuracy of weather prediction is improving as technology advances. A weather map is useful for making predictions. Weather maps usually show precipitation, wind direction, temperature, cloud cover, high or low pressure, cold and warm fronts, stationary and occluded fronts. Weather systems generally move from west to east across the USA. Long rang weather forecasting is more difficult than short-range weather predictions. Technologies such as computer, satellite images and radar enable forecasters to track movements of large-scale weather systems like air masses and fronts. Weather data collection results from using direct observations and measurements such as wind speed, wind direction, air temperature, humidity and air pressure. Wind direction can be shown by flags or blowing dust. The actual wind speed can be estimated by observing its affects. Temperature is a measure of the energy of molecules. The more energy the molecules in air have, the hotter it feels. Relative humidity compares the actual amount of water vapor in the air with the maximum amount of water vapor the air can hold at that temperature (its capacity). Differences in air pressure cause Earth’s winds and weather changes. Air pressure is simply the weight of the atmosphere per unit area. Air pressure is directed equally in all directions. Clouds have three simple names: Cirrus, Stratus, and Cumulus. These three names represent the three main cloud types. Cirrus clouds are high level clouds and due to high altitude, the water is almost frozen to form ice crystals. If there are isolated Cirrus clouds, they do not indicate any instability in the weather and may not bring rain. However, if the clouds are dense, they often indicate that a storm might be approaching. Both Stratus clouds and Cumulus clouds are low-level. Stratus clouds are layered clouds that usually bring a drizzle and there is widespread rain and in some cases ocean air. Cumulus clouds are neutral weather clouds. All the other clouds are combinations or variations of these types. Technology has greatly influenced the ease and accuracy of making weather predictions. Weather data at thousands of locations can be gathered instantaneously and applied to weather prediction models to produce weather maps. A cold front is the leading edge of a cooler air mass of air, replacing at ground level a warmer mass of air. The cooler, denser air wedges under the less-dense warmer air, lifting it. The upward motion causes lowered pressure along the cold front and can cause the formation of a narrow line of showers and thunderstorms when enough moisture is present. On weather maps, the surface position of the cold front is marked with the symbol of a blue line of triangles/spike pointing in the direction it is traveling. Cold fronts can move up to twice as fast as warm front and can produce sharper changes in the weather. Cold fronts are usually associated with an area of high pressure. A warm front is the leading edge of a warm air mass that displaces colder air, bringing a temperature increase and heavy rain where the front makes contact with the ground. On a weather map a warm front is represented by a solid line with semicircles pointing towards the colder air and in the direction of the movement. On a colored weather map, a warm front is drawn with a solid red line. |

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| **Public Schools of Robeson County****7TH Grade Science Curriculum** **Unit 2****Atmosphere/Weather/Climate** | **Strand: Earth Science** **Clarifying Objective: 7.E.1.5** **Days: 5** **Dates: Oct. 5- Oct. 9**  |

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| **Essential Standard** | **Clarifying Objectives** |
| **7.E.1** Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth’s atmosphere, weather, and climate | **7.E.1.5** Explain the influence of convection, global winds, and the jet stream on weather and climate conditions |
| **Literacy Standards** |
| **Reading Standard**:**RI 7.1:** Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. **RI 7.4:** Determine the meaning of words and phrases as they are used in a text**Writing Standard**: **W.7.1:** Write arguments to support claims with clear reasons and relevant evidence.**W.7.2:** Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.**W.7.6:** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. |
| **Technology Standards** |
| **7.SI.1.3** – Evaluate resources for point of view, bias, values, or intent of information.  |
| **Essential Questions** |
| How do global winds, the jet stream, and energy transfer impact weather and climate? |
| **Students Will Be Able To:** | **Students Will Know:** |
| * Explain how winds are the product of uneven heating of the atmosphere
* Explain how the uneven heating of the Earth causes global and local winds patterns.
* Describe the influence of global and local wind patterns on weather and climate.
* Compare global winds, jet streams, and land/sea breezes
* Evaluate the relationship between wind speed and the pressure gradient
 | * How thermal energy influences climate
* Local and global wind patterns
* All winds result from uneven heating of the atmosphere
* Earth’s rotation creates the Coriolis Effect
* Relationship between wind speed and pressure gradient
 |
| **Graphic Organizer** |
| https://my.hrw.com/nsmedia/intgos/html/igo.htm |
| **Assessments/Probes** |
| **Formative Assessment**Bell WorkModel of atmospheric layers with propertiesIllustrations/posters[Science Assessment Probe](https://drive.google.com/drive/search?q=Science%20Assessment%20probes)Volume 1Is it Melting? Pages 73-77Wet Jeans Pages 155-161Mitten Problem Pages 103-108Objects and Temperature Pages 109-114Volume 2Floating Logs Pages 27-32Floating High and Low Pages 33-39Solids and Holes Pages 41-46What’s in the Bubbles? Pages 65-70Volume 3Floating Balloons Pages 39-44Hot and Cold Balloons Pages 45-50What are Clouds Made of? Pages 155-161Where did the Water Come From? Pages 163-169Rain Fall Pages 171-176 | **Summative Assessment**Teacher made assessmentsQuizzesDiagramming and labeling |
| **Vocabulary** |
| * Coriolis Effect
* Gulf Stream
* Jet Stream
* Pressure Gradient
* North Pole
* South Pole
* Climate
 | * Thermal Energy
* Latitude
* Longitude
* Equator
* Land Breeze
* Sea Breeze
 |
| **Resources** |
| Quizlet[http://weather.weatherbug.com/](http://weather.weaterbug.com/)<http://www.srh.noaa.gov/jetstream//matrix.htm><http://weather.unisys.com/> <http://www.weather.com/> (The Weather Channel)<http://www.wral.com/weather/> (Doppler 5000 and iControl Doppler) |
| **Vertical Alignment**5.E.1 Understand weather patterns and phenomena, making connections to the weather in a particular place and timeEEn.2.5 Understand the structure of processes within our atmosphereEEn.2.6 Analyze patterns of global climate change over time |
| **Unpacking:** **7.E.1.5:** Thermal energy carried by ocean currents has a strong influence on climates around the world. Areas near oceans tend to have more moderate temperatures than they would if they were farther inland but at the same latitude because water in the oceans can hold a large amount of thermal energy. Changes in weather involve air movements, formation of clouds, and precipitation. Energy is needed to make all these things happen. That energy comes from the sun. Convection is very important in moving heat through the atmosphere and the oceans. It transfers heat from one place to another. All winds result from uneven heating of the atmosphere. An island, is surrounded by cool water. During the day, the island heats faster than the water and so the air above the island becomes warmer. The molecules in the air become farther apart; so the air expands upward and outward. This expansion lowers the air pressure at the island’s surface. The cooler ocean air moves in toward the low-pressure area over the island. There is a pressure gradient between the ocean and the island. The wind moves form high to low pressure. The speed of the wind depends on the pressure gradient. The lower the pressure (the hotter the island), the steeper the pressure gradient and the stronger the wind. The pressure gradient provides the force that makes the wind blow. This force is called the pressure-gradient force. Wind speeds are very high in the upper troposphere. It is here that the spectacular jet stream is found. Jet streams are a fairly narrow zone of very strong winds in the upper troposphere. Jet streams are most common in the middle latitudes, so the winds in the jet streams are usually from the west. Winds are also influenced by the Coriolis effect, which is due to the Earth rotating on its axis. Rather than flowing directly from areas of high pressure to low pressure, as they would on a non-rotating planet, winds and currents tend to flow to the right of this direction north of the equator, and to the left of this direction south of the equator. This effect is responsible for the rotation of large cyclones. The Gulf Stream is a powerful, warm surface current in the North Atlantic Ocean. It is one of the strongest know currents. As the Gulf Stream reaches Cape Hatteras, North Caroling the cold current that flows from the north separates it from the coast. When the warm Gulf Stream waters from the south (Florida) combine with the cold winds a dense concentration of fog forms along with an immense heat transfer causing atmospheric storms to intensify in this region.  |

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| **Public Schools of Robeson County****7TH Grade Science Curriculum** **Unit 6****Atmosphere/Weather/Climate** | **Strand: Earth Science** **Clarifying Objective: 7.E.1.6****Days: 5**  **Dates: Oct. 12- Oct. 16**  |

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| **Essential Standard** | **Clarifying Objectives** |
| **7.E.1** Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth’s atmosphere, weather, and climate | **7.E.1.6** Conclude that the good health of humans requires: monitoring the atmosphere, maintaining air quality, and stewardship |
| **Literacy Standards** |
| **Reading Standard**: **RI 7.2:** Determine two or more central ideas in a text and analyze their development over the course of the text; provide an objective summary of the text.**RI 7.8:** Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims.  **Writing Standard**: **W.7.1:** Write arguments to support claims with clear reasons and relevant evidence.**W.7.6:** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. |
| **Technology Standards** |
| **7.SI.1.1** – Evaluate resources for reliability. (Reliability can be determined by currency, credibility, authority, etc. depending on the curriculum topic). **7.TT.1.2** – Use appropriate technology tools and other resources to organize information (e.g. graphic organizers, databases, spreadsheets, and desktop publishing).  |
| **Essential Questions** |
| * How do monitoring the atmosphere and maintaining air quality affect the health of humans?
 |
| **Students Will Be Able To:** | **Students Will Know:** |
| * Analyze the effect of ozone on the troposphere
* Assess other human activities that impact the quality of the troposphere
* Evaluate the impact of pollution on the water cycle
* Analyze the conditions that qualify for each level of air quality alerts
 | * Effect of ozone on the troposphere
* Human activities that impact the quality of the troposphere
* how pollution enters the water cycle
* Air quality
 |
| **Graphic Organizer** |
| https://my.hrw.com/nsmedia/intgos/html/igo.htm |
| **Assessments/Probes** |
| **Formative Assessment**Bell Work[Science Assessment Probe](https://drive.google.com/drive/search?q=Science%20Assessment%20probes)Volume 4Global Warming Pages 143-150 | **Summative Assessment**Teacher made assessmentsQuizzes |
| **Vocabulary** |
| * Global Warming
* Greenhouse Gases
* Environmental Protection Agency
* Pollution
 | * Smog
* Fossil Fuel
* Point Source Pollution
* Acid Rain
* Non-Point Source Pollution
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| **Resources** |
| SM ART Technologies<http://weather.weaterbug.com/><http://www.srh.noaa.gov/jetstream//matrix.htm><http://weather.unisys.com/> <http://www.weather.com/> (The Weather Channel)<http://www.wral.com/weather/> (Doppler 5000 and iControl Doppler)Quizlet |
| **Vertical Alignment**5.E.1 Understand weather patterns and phenomena, making connections to the weather in a particular place and timeEEn.2.5 Understand the structure of processes within our atmosphereEEn.2.6 Analyze patterns of global climate change over time |
| **Unpacking:** **7.E.1.6:** Air quality affects the quality of life for all organisms on Earth. Natural and human activities greatly influence the quality of the air. The environment may contain dangerous levels of substances that are harmful to human beings. Therefore, the good health of individuals requires monitoring the soil, air, and water and taking steps to make them safe. Air quality affects the quality of life for all organisms on Earth. Natural and human activities greatly influence the quality of the air. Technology has allowed us to measure the characteristics of the air and to monitor how air quality changes. This information helps us to make informed decisions to protect air quality and risks to human health and other organisms. The cumulative ecological effects of global ozone depletion, air pollution, increased particulate matter, acid rain, and global warming concern the entire global community. Studies have shown that the human impact on these factors has impacted the global system. Using less fossil fuel is the best way to improve air quality. Most forms of transportation and many industries produce carbon dioxide and add particles to the air and reduce the quality of the atmosphere. The burning of fossil fuels is the major cause of air pollution. Smog is a colloid of smoke, fog, and chemicals. Many areas have smog problems. Smog irritates the lungs. The burning of fossil fuels releases large amounts of carbon dioxide and other gases into the air. Some of these gases mix with water vapor and then form acid rain. Acid rain is harmful to both living and non-living things. Natural events also release pollutants such as forest fires, volcanic eruptions and plant pollen. Because air pollutants are often carried along by prevailing winds, acid rain may fall far from the source of pollution. Laws exist to help control and reduce air pollution. The Environmental Protection Agency (EPA) provides daily information about air quality. Local weather channels also issue information related to the health of the atmosphere. Air pollution does not consist entirely of man-made substances. Many pollutants are released directly from natural sources, and some pose as much of a health hazard as man-made substances. These “natural” pollutants include radon, pollen and mold spores. Others are dust from plowed fields and volcanic eruptions. These eruptions could create situations where planes could not fly.  |

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| **Public Schools of Robeson County****7TH Grade Science Curriculum** **Unit 3****Structures and Functions of Living Organisms** | **Strand: Life Science****Clarifying Objective: 7.L.1.1****Days: 4**  **Dates: Oct. 19 - Oct. 22** |

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| **Essential Standard** | **Clarifying Objectives** |
| **7.L.1** Understand the processes. Structures, and functions of living organisms that enable them to survive, reproduce, and carry out the basic functions of life. | **7.L.1.1** Compare the structures and life functions of single-celled organisms that carry out all of the basic functions of life including: Euglena, Amoeba, Paramecium, and Volvox |
| **Literacy Standards** |
| **Reading Standard**: **RI 7.1:** Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. **RI 7.4:** Determine the meaning of words and phrases as they are used in a text**Writing Standard**: **W.7.5:** Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.**W.7.6:** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. |
| **Technology Standards** |
| **7.TT.1.2** – Use appropriate technology tools and other resources to organize information (e.g. graphic organizers, databases, spreadsheets, and desktop publishing).  |
| **Stuggested Essential Questions** |
| * How do the structures of protists compare in enableing life’s functions?
 |
| **Student Will Be Able To:** | **Students Will Know:** |
| * Identify the basic structures of single-celled organisms
* Identify the methods single-celled organisms use to carry out basic life functions
* Compare and contrast the methods used by single-celled organisms and humans to carry out basic life functions
 | * structures of single-celled organisms
* methods single-celled organisms use to carry out basic life functions
* differences between the structures of single-celled organisms
 |
| **Graphic Organizer** |
| https://my.hrw.com/nsmedia/intgos/html/igo.htm |
| **Assessments/Probes** |
| **Formative Assessment**Bell Work[Life Science Assessment Probe](https://drive.google.com/drive/search?q=Science%20Assessment%20probes)Volume 1Pond Water Pages 33-38 | **Summative Assessment**Teacher made assessmentsDiagramming and labeling |
| **Vocabulary** |
| * Cilia
* Flagellum
* Eye Spot
* Pseudopod
* Protists
 | * Secretion
* Chlorophyll
* Engulf
* colony
 |
| **Resources** |
| [www.cellsalive.com](http://www.cellsalive.com)SMART technologies<http://www.eduplace.com/science/hmxs/ls/pdf/5rs_2_1-3.pdf> (Euglena)<http://www.uga.edu/protozoa/education/students/for_students_sop_web_ora.doc> (Protists)<http://www.eduplace.com/science/hmxs/ls/pdf/5rs_2_1-7.pdf> (Volvox)<http://www.eduplace.com/science/hmxs/ls/pdf/5rs_2_1-4.pdf> (Paramecium)<http://www.eduplace.com/science/hmxs/ls/pdf/5rs_2_1-2.pdf> (Amoeba)Quizlet |
| **Vertical Alignment**5.L.1 Understand how structures and systems of organisms (to include the human body) perform functions necessary for life6.L.1 Understand the structures, processes, and behaviors of plants that enable them to survive and reproduce8.L.1 Understand the structure and hazards caused by agents of disease that effect living organisms8.L.5 Understand the composition of various substances as it related to their ability to serve as a source of energy and building material for growth and repair of organismsBIO.1.1 Understand the relationship between the structures and functions of cells and their organellesBIO.1.2 Analyze the cell as a living systemBIO.4.1 Understand how biological molecules are essential to the survival of living organismsBIO 4.2 Analyze the relationships between biochemical processes and energy use in the cell |
| **Unpacking:****7.L.1.1** Compare the structures and life functions of single-celled organisms that carry out all of the basic functions of life including: • Euglena, Amoeba, Paramecium, Volvox |

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| **Public Schools of Robeson County****7TH Grade Science Curriculum** **Unit 3****Structures and Functions of Living Organisms** | **Strand: Life Science** **Clarifying Objective: 7.L.1.2** **Days: 6****Dates: Oct. 23- Oct. 30**  |

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| **Essential Standard** | **Clarifying Objectives** |
| **7.L.1** Understand the processes. Structures, and functions of living organisms that enable them to survive, reproduce, and carry out the basic functions of life. | **7.L.1.2** Compare the structures and functions plant and animal cells, including major organelles (cell membrane, cell wall, nucleus, chloroplasts, mitochondria, and vacuoles) |
| **Literacy Standards** |
| **Reading Standard**: **RI 7.2:** Determine two or more central ideas in a text and analyze their development over the course of the text; provide an objective summary of the text.**RI 7.8:** Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims. **Writing Standard**: **W.7.5:** Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.**W.7.6:** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.  |
| **Technology Standards** |
| 7.TT.1.1 – Use appropriate technology tools and other resources to access information. 7.RP.1.1 – Implement a collaborative research process activity that is group selected. 7.SE.1.1 – Apply ethical behavior (copyright, not plagiarizing, proper netiquette) when using resources. 7.SE.1.2 – Evaluate content for relevance to the assigned task.  |
| **Suggested Essential Questions** |
| * How do the structure and function of plant and animal cells compare?
* What criteria would you use to differentiate between the organelles of different types of cells?
 |
| **Students Will Be Able To:** | **Students Will Know:** |
| * Identify the major structures of palnt and animal cells
* Summarize the functions of the cell membrane, cell wall, nucleus, chloroplasts, mitochondria, and vacuoles
* Compare the major structures and functions of animal and plant cells
 | * Plant cells have a cell wall, chloroplasts, and a large central vacuole
* Functions of organelles of plant and animal cells
* Major differences and commonalities of plant and animal cells
 |
| **Graphic Organizer** |
| https://my.hrw.com/nsmedia/intgos/html/igo.htm |
| **Assessments/Probes** |
| **Formative Assessment**Bell Work[Science Assessment Probe](https://drive.google.com/drive/search?q=Science%20Assessment%20probes)Volume 1Is it living? Pages 123-130Is it Made of Cells? Pages 131-137Functions of Living Things Pages 147-153Volume 2Whale and Shrew Pages 137-142Volume 3Cells and Size Pages 117-123Life Science Assessment ProbeVolume 1Cucumber Seeds Pages 9-14Light and Dark Pages 63-68 | **Summative Assessment**Teacher made assessmentsQuizzesDiagramming and Labeling |
| **Vocabulary** |
| * Cell Membrane
* Cell Wall
* Nucleus
* Microscope
 | * Chloroplast
* Mitochondria
* Vacuoles
 |
| **Resources** |
| [www.kidshealth.org](http://www.kidshealth.org)[www.cellsalive.com](http://www.cellsalive.com)Quizlet |
| **Vertical Alignment**5.L.1 Understand how structures and systems of organisms (to include the human body) perform functions necessary for life6.L.1 Understand the structures, processes, and behaviors of plants that enable them to survive and reproduce8.L.1 Understand the structure and hazards caused by agents of disease that effect living organisms8.L.5 Understand the composition of various substances as it related to their ability to serve as a source of energy and building material for growth and repair of organismsBIO.1.1 Understand the relationship between the structures and functions of cells and their organellesBIO.1.2 Analyze the cell as a living systemBIO.4.1 Understand how biological molecules are essential to the survival of living organismsBIO 4.2 Analyze the relationships between biochemical processes and energy use in the cell |
| **Unpacking:****7.L.1.2** Compare the structures and functions of plant and animal cells, including major organelles (cell membrane, cell wall, nucleus, chloroplasts, mitochondria, and vacuoles).  |

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| **Public Schools of Robeson County****7TH Grade Science Curriculum** **Unit 3****Structures and Functions of Living Organisms** | **Strand: Life Science** **Clarifying Objective: 7.L.1.3****Days: 5** **Dates: Nov. 2 - Nov. 6**  |

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| **Essential Standard** | **Clarifying Objectives** |
| **7.L.1** Understand the processes. Structures, and functions of living organisms that enable them to survive, reproduce, and carry out the basic functions of life. | **7.L.1.3** Summarize the hierarchical organization of multicellular organisms from cells to tissues to organs to systems to organisms. |
| **Literacy Standards** |
| **Reading Standard**: **RI 7.1:** Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. **Writing Standard**: **W.7.2:** Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.**W.7.6:** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. |
| **Technology Standards** |
| **7.TT.1.2** – Use appropriate technology tools and other resources to organize information (e.g. graphic organizers, databases, spreadsheets, and desktop publishing).  |
| **Essential Questions** |
| * How do cells in unicellular and multicellular organisms differ?
* How are the parts of the hierarchical organization of a multicellular organism related?
* What information can you use to prove the hierarchical relationship in multicellular organisms?
 |
| **Students Will Be Able To:** | **Students Will Know:** |
| * Summarize the heirarchical oganization from individual cell to multicellular organisms
* Deduce that cells are the smallest unit of life
 | * Cells are the smallest unit of life
* Levels of organization of living organisms
* differences between cells, tissues, organs and organ systems
 |
| **Graphic Organizer** |
| **https://my.hrw.com/nsmedia/intgos/html/igo.htm** |
| **Assessments/Probes** |
| **Formative Assessment**Bell Work[Life Science Assessment Probe](https://drive.google.com/drive/search?q=Science%20Assessment%20probes)Volume 1Human Body Pages 141-144 | **Summative Assessment**Teacher made assessmentsQuizzesDiagramming and Labeling |
| **Vocabulary** |
| * Cell
* Tissue
* Organ
 | * Organ System
* Organism
 |
| **Resources** |
| <http://peer.tamu.edu/curriculum_modules/cell_biology/module_l/index.htm>[http://mwsu-bio101.ning.com/profiles/blogs/2263214:BlogPost:2543](http://mwsu-bio101.ning.com/profiles/blogs/2263214%3ABlogPost%3A2543)<http://www.eoarth.org/article/Organ_systems_and_organs><http://classes.midlandstech.edu/carterp/Courses/bio210/chap01/chap01.html>Quizlet |
| **Vertical Alignment**5.L.1 Understand how structures and systems of organisms (to include the human body) perform functions necessary for life6.L.1 Understand the structures, processes, and behaviors of plants that enable them to survive and reproduce8.L.1 Understand the structure and hazards caused by agents of disease that affect living organisms8.L.5 Understand the composition of various substances as it related to their ability to serve as a source of energy and building material for growth and repair of organismsBIO.1.1 Understand the relationship between the structures and functions of cells and their organellesBIO.1.2 Analyze the cell as a living systemBIO.4.1 Understand how biological molecules are essential to the survival of living organismsBIO 4.2 Analyze the relationships between biochemical processes and energy use in the cell |
| **Unpacking:****7.L.1.3:** Summarize the hierarchical organization of multicellular organisms from cells to tissues to organs to systems to organisms. |

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| **Public Schools of Robeson County****7TH Grade Science Curriculum** **Unit 4****Human Body**  | **Strand: Life Science****Clarifying Objective: 7.L.1****Days: 36****Dates: Nov. 9 - Jan. 19**  |

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| **Essential Standard** | **Clarifying Objectives** |
| **7.L.1** Understand the processes, structures, and functions of living organisms that enable them to survive, reproduce, and carry out the basic functions of life. | **7.L.1.4** Summarize the general functions of the major systems of the human body (digestion, respiration, reproduction, circulation, and excretion) and ways that these systems interact with each other to sustain life. |
| **Literacy Standards** |
| **Reading Standard**: **RI 7.8:** Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims. **Writing Standard**: **W.7.2:** Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.**W.7.5:** Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.**W.7.6:** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.  |
| **Technology Standards** |
| **7.RP.1.1** – Implement a collaborative research process activity that is group selected. **7.TT.1.2** – Use appropriate technology tools and other resources to organize information (e.g. graphic organizers, databases, spreadsheets, and desktop publishing).  |
| **Essential Questions** |
| * What similarities occur between the structures and functions across the systems of the human body?
* How can an imbalance in homeostasis result in a disruption in any human system?
 |
| **Students Will Be Able To:** | **Students Will Know:** |
| * Identify the organs and structures of each body system
* Describe the functions of the organs and structures of each body system
* Analyze how the imbalance in homeostasis may result from a disruption in any human body system
* Evaluate how each body system works together to maintain homeostasis in the human body
 | * Major organs and organ systems of the body
* Function of major organs and organ systems of the body
* Homeostasis
* Structures and functions of the five body systems (digestive, excretory, respiratory, reproductive, and circulatory)
* Interactions that occur between systems
 |
| **Graphic Organizer** |
| https://my.hrw.com/nsmedia/intgos/html/igo.htm |
| **Assessments/Probes** |
| **Formative Assessment**Bell Work[Science Assessment Probe](https://drive.google.com/drive/search?q=Science%20Assessment%20probes)Volume 1Human Body Basics Pages 139-145Volume 3Respiration Pages 131-137Volume 4Is it Food? Pages 111-117Catching a Cold Pages 145-150Digestive System Pages 151-156Life Science Assessment ProbeVolume 1Excretory System Pages 145-150Antibiotics Pages 151-156 | **Summative Assessment**Teacher made assessments QuizzesDiagramming and labeling |
| **Vocabulary** |
| * Mechanical digestion
* Chemical digestion
* Enzymes
* Insulin
* Hormones
* Villi
* Saliva
* Embryo
* Urine
* Ureter
* Urethra
* Penis
* Vagina
* Testicles
* Uterus
* Ovary
* Ovulation
* Menstruation
* Kidneys
* Skin
* Bronchial tubes
* Lungs
* Trachea
* Sphincter
* Chime
* Ulcer
* Liver
* Pancreas
* Larynx
 | * Arteries
* Veins
* Capillaries
* Ventricles
* Atria
* Hypertension
* Plasma
* Hemoglobin
* White blood cells
* Red blood cells
* Platelets
* Respiration
* Bronchitis
* Asthma
* Sperm
* Egg
* Fertilization
* Peristalsis
* Pathogen
* Perspiration
* Alveoli
* Esophagus
* Anus
* Feces
* Bladder
* Duodenum
* Gallbladder
* Tongue
* Heart
 |
| **Resources** |
| <http://dpisciencejanewright.pbworks.com/w/page/24074657/7th-Grade-DPI-SCIENCE-Units><http://facultywashington.edu/chudler/neurok.html><http://science.education.nih.gov/customers.nsf/middleschool.htm><http://www.choosemyplate.gov/><http://classes.midlandstech.edu/carterp/Courses/bio210/chap01/chap01.html>http://edu.symbaloo.com/mix/humanbodyunitQuizlet |
| **Vertical Alignment**3.L.1 Understand human body system and how they are essential for life: protection, movement, and support.4.L.2 Understand the food and benefits of vitamins, minerals, and exercise.BIO.4.1 Understand how biological molecules are essential to the survival of living organisms.BIO.4.2 Analyze the relationships between biochemical processes and energy use within the cell. |
| **Unpacking:****7.L.1.4:** To burn food for the release of energy stored in it, oxygen must be supplied to cells, and carbon dioxide removed. Lungs take in oxygen for the combustion of food and eliminate the carbon dioxide produced. The urinary system disposes of dissolved waste molecules, the intestinal tract removes solid wastes, and the skin and lungs aid in the transfer of thermal energy from the body. The circulatory system moves all these substances to or from cells where they are needed or produced, responding to changing demands. The human body has a set of systems, which regulate the internal environment and strive to give our cells the necessary conditions they need to function. These systems are made up of organs; each organ system functions in the human body and works in cooperation with other systems to benefit the entire organism. The skeletal system provides the support for movement and protection of internal organs. The muscular system creates the force that enables the body to move and carry out different functions related to movement. The body’s circulatory, respiratory, digestive and urinary systems work in combination to supply all cells with what they need to function properly and remove wastes. The reproductive system enables the organism to make more of its kind. The immune system protects cells from microscopic invaders. The nervous system controls body processes by using electrical impulses via a network of nerves. The endocrine system uses chemical messages called hormones, which are released into the blood and regulate many bodily processes. The endocrine and nervous systems are two control systems that keep the body in balance (homeostasis). Body systems work together in maintaining a constant internal environment. When the balance is disrupted, the body systems may not function properly and human health can suffer.  |

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| **Public Schools of Robeson County****7TH Grade Science Curriculum****Unit 5****Evolution and Genetics** | **Strand: Life Science****Clarifying Objective: 7.L.2** **Days: 6**  **Dates: Jan. 20 - Jan. 28**  |

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| **Essential Standard** | **Clarifying Objectives** |
| **7.L.2** Understand the relationship of the mechanisms of cellular reproduction, patterns of inheritance, and external factors to potential variation among offspring. | **7.L.2.1** Explain why offspring that result from sexual reproduction (fertilization and meiosis) have greater variation than offspring that result from asexual reproduction (budding and mitosis) |
| **Literacy Standards** |
| **Reading Standard**: **RI 7.1:** Cite pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. several **Writing Standard**: **W.7.2:** Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.**W.7.6:** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. |
| **Technology Standards** |
| **7.TT.1.2** – Use appropriate technology tools and other resources to organize information (e.g. graphic organizers, databases, spreadsheets, and desktop publishing).  |
| **Suggested Essential Questions** |
| * How is asexual reproduction different from sexual reproduction?
* Evaluate the advantages and disadvantages of asexual reproduction
* Evaluate the advantages and disadvantages of sexual reproduction
* Compare the results of asexual and sexual reproduction
 |
| **StudentsWill Be Able To:** | **Students Will Know:** |
| * Describe different types of reproduction - sexual and asexual
* Diagram mitosis and meiosis
* Evaluate the outcomes of asexual and sexual reproduction
 | * Genes come from parents
* Mitosis and Meiosis
* Asexual reproduction offspring are identical to parent while sexual reproduction results in genetic variation in offspring
 |
| **Graphic Organizer** |
| <https://my.hrw.com/nsmedia/intgos/html/igo.htm>  |
| **Assessments/Probes** |
| **Formative Assessment**Bell Work[Science Assessment Probes](https://drive.google.com/drive/search?q=Science%20Assessment%20probes)Volume 3Sam’s Puppy Pages 125-130Volume 4Chicken Eggs Pages 125-131Life Science Assessment ProbesVolume 1Eggs Pages 117-121 | **Summative Assessment**Teacher made assessmentsQuizzesDiagramming and Labeling |
| **Vocabulary** |
| * Asexual
* Sexual
* Budding
* Mitosis
* Chromosomes
* Regeneration
* Zygote
* DNA
* Mitosis
* Haploid
* Gamete
* Prokaryote
 | * Meiosis
* Genes
* Prophase
* Metaphase
* Anaphase
* Teleophase
* Sex Cells
* Fertilization
* Cell Division
* Diploid
* Eukaryote
* Binary Fission
 |
| **Resources** |
| [www.cellsalive.com](http://www.cellsalive.com)<http://www.youtube.com/watch?v=kaSIjlzAtYA> <http://www.youtube.com/watch?v=JZLHJZZS-Y><http://www.biotropics.co.uk/genesl/asexual_and_sexual_reproduction.html> Quizlet |
| **Vertical Alignment**BIO.4.1 Understand how biological molecules are essential to the survival of living organismsBIO 4.2 Analyze the relationships between biochemical processes and energy use in the cell |
| **Unpacking:****7.L.2.1:** In some kinds of organisms, all the genes come from a single parent. In organisms that have two sexes, typically half of the genes come from each parent. In sexual reproduction, a single specialized cell from a female merges with a specialized cell from a male. Budding is a type of asexual reproduction in which a cell or group of cells pinch off from the parent to form a new individual. Mitosis is a type of asexual reproduction is when a nucleus undergoes cell division in which two daughter cells are formed, each containing a complete set of chromosomes. Meiosis is a type of sexual reproduction. A form of cell division that allows offspring to have the same number of chromosomes as their parent. This kind of cell division, which produces gametes (sex cell) containing half the number of chromosomes as a parent’s body cell, is called meiosis. Fertilization is a type of sexual reproduction where there is a fusion of male (sperm) and female (egg) sex cells. Genetics explains why you have inherited certain traits from your parents. If you understand how meiosis occurs, you can see how these traits were passed on to you. A gene is a segment of DNA that controls the protein production and the cell cycle. Chromosomes are cell structures that carry the genetic material that is copied and passed from generation to generation of cells. People have noticed for thousands of years that family resemblances were inherited from generation to generation so characteristics that are inherited are called traits. A dominant trait is an observable trait of an organism that masks the recessive form of a trait. A recessive trait of an organism can be masked by the dominant form of a trait. Two organisms can look alike but have different underlying gene combinations. The way an organism looks and behaves makes up its phenotype. The phenotype of a tall plant is tall, regardless of the genes it contains. The gene combination an organism contains is known as it genotype. You cannot always know an organism’s genotype simply by looking at its phenotype. New varieties of cultivated plants and domestic animals have resulted from selective breeding for particular traits. In sexual reproduction, a single specialized cell from a female merges with a specialized cell from a male. In some kinds of organism, all the genes come from a single parent. In organisms that have two sexes, typically half of the genes come from each parent. The fertilized egg cell, carrying genetic information from each parent, multiplies to form the complete organism. Cultivated plants are plants that have been changed somewhat to promote survival in different conditions due to intentional human activity. Agriculture, forestry and horticulture use these cultivated plants.  |

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| **Public Schools of Robeson County****7TH Grade Science Curriculum Unit 4****Evolution and Genetics** | **Strand: Life Science** **Clarifying Objective: 7.L.2** **Days: 17** **Dates: Jan. 29 - Feb. 22**  |

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| **Essential Standard** | **Clarifying Objectives** |
| **7.L.2** Understand the relationship of the mechanisms of cellular reproduction, patterns of inheritance, and external factors to potential variation among offspring. | **7.L.2.2** Infer patterns of heredity using information from Punnett squares and pedigree analysis**7.L.2.3** Explain the impact of the environment and lifestyle choices on biological inheritance (to include common genetic diseases) and survival |
| **Literacy Standards** |
| **Reading Standard:** **RI 7.1:** Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. **RI 7.4:** Determine the meaning of words and phrases as they are used in a text**Writing Standard**: **W.7.2:** Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.**W.7.5:** Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.**W.7.6:** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. |
| **Technology Standards** |
| **7.TT.1.2** – Use appropriate technology tools and other resources to organize information (e.g. graphic organizers, databases, spreadsheets, and desktop publishing). **7.RP.1.2** – Implement an independent research process activity that is student selected. **7.SE.1.1** – Apply ethical behavior (copyright, not plagiarizing, proper netiquette) when using resources. **7.SE.1.2** – Evaluate content for relevance to the assigned task. |
| **Suggested Essential Questions** |
| * What evidence would you use to construct an argument that human characteristics are a product of inheritance, environmental factors or lifestyle choices?
 |
| **Students Will Be Able To:** | **Students Will Know:** |
| * Differentiate between dominant and recessive alleles (types of genes)
* Explain how genes and alleles are related to genotype and phenotype
* Infer patterns of human genetics and predict probability of traits in offspring using a Punnett square
* Explain the evidence that human characteristics are a product of inheritance, environment, and lifestyle choices
 | * Dominant, recessive and incomplete dominance
* Genes are the unit of information and Parents transmit genes to their offspring
* Punnett squares and the role of probability in the study of heredity
* Evidence that human characteristics are a product of: Inheritance, Environmental factors, Lifestyle choices
 |
| **Graphic Organizer** |
| https://my.hrw.com/nsmedia/intgos/html/igo.htm |
| **Assessments/Probes** |
| **Formative Assessment**Bell Work[Science Assessment Probe](https://drive.google.com/drive/search?q=Science%20Assessment%20probes)Volume 2Baby Mice Pages 129-136Life Science Assessment ProbeVolume 1DNA, Genes, and Chromosomes Pages 129-133Eye Color Pages 135-139 | **Summative Assessment**Teacher made assessmentsQuizzesDiagramming and labeling |
| **Vocabulary** |
| * Allele
* Gene
* Genotype
* Phenotype
* Punnett Square
* Dominant Trait
* Recessive Trait
* Incomplete Dominance
* Sex-Linked Gene
 | * Chromosome
* Homozygous
* Heterozygous
* Heredity
* Genetics
* Mendel
* Codominance
* Mutation
* Genetic Engineering
 |
| **Resources** |
| <http://www.athro.com/evo/gen/geframe.html><http://www.biology.clc.us.edu/courses/bio105/geneprobe.htm><http://www.ccoe.net/genetics/daddy2adv.html><http://learn.genetics.utah.edu/><http://www.science-class.net/Biology/Genetics.htm> Quizlet |
| **Vertical Alignment**5.L.3 Understand why organisms differ from one or are similar to their parents based on the characteristics of that organismBIO.3.1 Explain how traits are determined by the structure and function of DNABIO.3.2 Understand how the environment and/or interaction of alleles, influences the expression of genetic traits |
| **Unpacking:** **7.L.2.2:** A pedigree is a diagram of family relationships that uses symbols to represent people and lines to represent genetic relationships. These diagrams make it easier to visualize relationships within families. Pedigrees are often used to determine the mode of inheritance (dominate, recessive, etc.) of genetic diseases. A Punnett Square is a chart wherein all possible gene combinations are shown in a cross of parents. Reginald Punnett was an English Geneticist who discovered some very basic principles of genetics including the determination of sex and linkage. His work involved using the color characteristics of a chicken’s feathers, efficiently separating the female gender of the chicken from the male. In plants, a tall plant is considered dominant over a short plant. In using Punnett Squares, you can easily predict genotype and phenotypes of any offspring. **7.L.2.3:** Individual organisms with traits conducive to the environment’s stressors are more likely than others to survive and have offspring. Changes in environmental conditions can affect the survival of individual organisms and entire species. Analysis of the patterns of genetic traits enhances the understanding of genetic diseases and allows for predictions to be made by studying pedigrees. Some traits are inherited and others result from interactions with the environment, life style choices, and environmental influence human characteristics that may or may not be passed on to future generations. Some animal species are limited to a repertoire of genetically determined behaviors; other have more complex brains and can learn and modify a wide variety of behaviors. All behavior is affected by both inheritance and experience. The length and quality of human life are influenced by many factors, including sanitation, diet, medical care, sex, genes, environmental conditions, and personal health behaviors. Faulty genes can cause body parts or systems to work poorly. Some genetic diseases appear only when an individual has inherited a certain faulty gene from both parents. |

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| **Public Schools of Robeson County****7TH Grade Science Curriculum** **Unit 6****Motion and Forces** | **Strand: Physical Science****Clarifying Objective: 7.P.1** **Days: 19** **Dates: Feb. 23 - Mar. 17** |

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| **Essential Standard** | **Clarifying Objectives** |
| **7.P.1** Understand motion, the effect of forces on motion, and the graphical representations of motion | **7.P.1.1** Explain how the motion of an object can be described by its position, direction of motion, and speed with respect to some other object**7.P.1.2** Explain the effects of balanced and unbalanced forces acting on an object (including friction, gravity, and magnets)**7.P.1.3** Illustrate the motion of an object using a graph to show a change in position over a period of time**7.P.1.4** Interpret distance versus time graphs for constant speed and variable motion |
| **Literacy Standards** |
| **Reading Standard**: **RI 7.1:** Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. **RI 7.8:** Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims. **Writing Standard**: **W.7.6:** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.  |
| **Technology Standards** |
| **7.TT.1.2** – Use appropriate technology tools and other resources to organize information (e.g. graphic organizers, databases, spreadsheets, and desktop publishing).  |
| **Suggested Essential Questions** |
| * How can the motion of an object be described using its position, direction of motion and speed relative to another object?
* What is the relationship between motions of an object in terms of its changing position?
* What inferences can be made about speed operationally and in terms of distance and time?
* What can be used to analyze speed of objects when interpreting data collected using distance line graphs? How can an object’s change in motion over time be illustrated?
 |
| **Students Will Be Able To:** | **Students Will Know:** |
| * Describe the motion of an object by its position in relation to a reference point
* Distinguish between speed and velocity
* Interpret motion and acceleration graphs
* Illustrate an object’s motion using a graph
* Analyze the effects of friction and gravity on the motion of an object
* Explain the differences balanced and unbalanced forces have on the motion of an object
 | * Motion is a change in position over time to a reference point
* Speed = distance/time, Acceleration = change in velocity/time, Force = mass x acceleration, Inertia is the tendency of an object to resist having its motion changed
* Balanced forces result in no change in motion
* Distance time graphs illustrate speed, Velocity time graphs illustrate acceleration
* Unbalanced forces result in a change in motion
* Many forces may be acting on an object.
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| **Graphic Organizer** |
| https://my.hrw.com/nsmedia/intgos/html/igo.htm |
| **Assessments/Probes** |
| **Formative Assessment**Bell Work[Science Assessment Probe](https://drive.google.com/drive/search?q=Science%20Assessment%20probes)Volume 1Gravity Pages 97-102Volume 3Apple on a Desk Pages 63-69Rolling Marbles Pages 71-76Dropping Balls Pages 77-82Volume 4Standing on one Foot Pages 81-86Magnets in Water Pages 87-91Physical Science Assessment ProbeVolume 1Assessments 1-38 (pages 15-180) | **Summative Assessment**Teacher made assessmentsQuizzesDiagramming and labelingCreating and interpreting graphs |
| **Vocabulary** |
| * Motion
* Speed
* Velocity
* Vector
* Inertia
* Momentum
* Weight vs. Mass
* Terminal Velocity
 | * Relative Motion
* Newton
* Net Force
* Unbalanced Force
* Balanced Force
* Gravity
* Friction
* Acceleration
* Slope
 |
| **Resources** |
| <http://www.learningscience.org/psc2bmotionforces.htm><http://www.exploratorium.edu/explore/staff_picks/sports_science/><http://www.fmalive.com/><http://www.science-class.net/Physics/Physics.htm>Quizlet |
| **Vertical Alignment**3.P.1 Understand motion and factors that affect motion4.P.1 Explain how various forces affect the motion of an object5.P.1 Understand force, motion, and the relationship between themPSc.1.1 Understand motion in terms of speed, velocity, acceleration, and momentumPSc.1.2 Understand the relationship between forces and motionPhy 1.1 Analyze the motion of objectsPhy 1.2 Analyze systems of force and their interactions with matterPhy 1.3 Analyze the motion of objects based on the principles of conservation of momentum, conservation of energy, and impulse |
| **Unpacking:** **7.P.1.1:** The motion of an object is always judged with respect to some other object or point. When an object changes position over time relative to a reference point, the object is in motion. Motion can be described with a reference direction such as North, South, East, West, up or down. The speed of an object is a measure of how quickly the object gets from one place to another. **7.P.1.2:** An unbalanced force acting on an object changes its speed or direction of motion, or both. The change in motion (direction or speed) of an object is proportional to the applied force and inversely proportional to the mass. All motion is relative to whatever frame of reference is chosen, for there is no motionless frame from which to judge all motion. Friction is a force that opposes motion between two surfaces that are in contact. The amount of friction depends on factors such as the roughness of the surfaces and the force pushing the surfaces together. Newton’s law describes the relationship between gravitational force, mass, and distance. An object will not start moving until a force acts upon it. An object will stay in motion forever unless an unbalanced force acts upon it. Inertia is the tendency of objects to resist any change in motion. Likewise, inertia is the reason a moving object stays in motion with the same velocity unless a force changes its speed or direction or both. *Note: Newton’s Laws should not be memorized at this age. Rather, the principles which underpin the Laws ought to be well conceptualized and applied.* **7.P.1.3:** When an object changes position over time relative to a reference point, the object is in motion. You can describe the direction of motion with a reference direction such as north, south, east, west, up or down. Collect and organize data to show how the motion of an object changes in position over a period of time. Communicate and graph data showing how the motion of an object changes in position over a period of time. 7.P.1.4 Students should collect and organize their own data for graphing distance versus time. Graphs for constant speed and variable motion. Students will interpret prepared graphs for distance versus time for constant speed and variable motion.  |

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| **Public Schools of Robeson County****7TH Grade Science Curriculum** **Unit 7****Energy: Conservation and Transfer**  | **Strand: Physical Science** **Clarifying Objective: 7.P.2** **Days: 12****Dates: Mar. 18 - Apr. 12**  |

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| **Essential Standard** | **Clarifying Objectives** |
| **7.P.2** Understand forms of energy, energy transfer, and transformation and conservation in mechanical systems. | **7.P.2.1** Explain how kinetic and potential energy contribute to the mechanical energy of an object**7.P.2.2** Explain how energy can be transferred from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples)**7.P.2.3** Recognize that energy can be transferred from one system to another when two objects push or pull on each other over a distance (work) and electrical circuits require a complete loop through which an electrical current can pass |
| **Literacy Standards** |
| **Reading Standard**: **RI 7.8:** Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims. **Writing Standard**: **W.7.2:** Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.**W.7.6:** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.  |
| **Technology Standards** |
| **7.TT.1.2** – Use appropriate technology tools and other resources to organize information (e.g. graphic organizers, databases, spreadsheets, and desktop publishing). **7.TT.1.3** – Use appropriate technology tools and other resources to design products to share information with others (e.g. multimedia presentations, Web 2.0 tools, graphics, podcasts, and audio files). **7.RP.1.2** – Implement an independent research process activity that is student selected. **7.SE.1.1** – Apply ethical behavior (copyright, not plagiarizing, proper netiquette) when using resources. |
| **Suggested Essential Questions** |
| * What effects do kinetic and potential energy have on mechanical energy?
* How can energy transfer be illustrated in a diagram or model?
* How is the law of conservation of energy represented in models or diagrams?
 |
| **Students Will Be Able To:** | **Students Will Know:** |
|  * Compare and contrast kinetic and potential energy
* Illustrate how energy is transferred from one form to another using a diagram or model
* Analyze the relationship between force and work
* Describe the passage of electrical current through a circuit
 | * Differences between kinetic and potential energy and mechanical energy
* Law of conservation of energy
* Work = force x distance
* Electrical current requires a complete electrical circuit to pass
 |
| **Graphic Organizer** |
| https://my.hrw.com/nsmedia/intgos/html/igo.htm |
| **Assessments/Probes** |
| **Formative Assessment**Bell Work[Science Assessment Probe](https://drive.google.com/drive/search?q=Science%20Assessment%20probes)Volume 1Mitten Problem Pages 103-108Volume 2Ice Cold Lemonade Pages 77-82Mixing Water Pages 83-89Volume 3Thermometer Pages 33-38Batteries, Bulbs, and Wires Pages 57-62Volume 4Ice Water Pages 65-71Warming Water Pages 73-79Camping Trip Pages 157-161Physical Science Assessment Probe Volume 1Probes 39-45 (pages 181-207) | **Summative Assessment**Teacher made assessmentsQuizzesDiagramming and labelingCreating and interpreting graphs |
| **Vocabulary** |
| * Mechanical
* Potential
* Kinetic
* Conservation of energy
* Thermal
* Nuclear
* Magnetism
 | * Work
* Power
* Joules
* Watt
* Electromagnetic
* Chemical
* Heat
 |
| **Resources** |
| <http://www.learningscience.org/psc2bmotionforces.htm>http://www,science-class.net/Physics/Physics.htmQuizlet |
| **Vertical Alignment**3.P.3 Recognize how energy can be transferred from one object to another4.P.3 Recognize that energy takes various forms that may be grouped based on their interaction with matter5.P.2 Understand the interactions of matter and energy and the changes that occur5.P.3 Explain how the properties of some materials change as a result of heating and cooling6.P.3 Understand the characteristics of energy transfer and interactions of matter and energy8.P.2 Explain the environmental implications associated with the various methods of obtaining, managing, and using energy resourcesPSc.3.1 Understand types of energy, conservation of energy, and energy transferPSc.3.2 Understand electricity and magnetism and their relationshipPhy.2.1 Understand the concepts of work, energy, and power, as well as the relationship among themPhy.2.3 Analyze the nature of moving charges and electrical circuitsPhy.3.1 Explain charges in electrostatic systemsPhy.3.2 Explain the concept of magnetism |
| **Unpacking:****7.P.2.1:** Mechanical energy is the energy possessed by an object due to its motion or its stored energy of position. Mechanical energy can be either kinetic (energy of motion) or potential (energy of position). An object that possesses mechanical energy is able to do work. Mechanical energy is the form involved in the operation of simple machines. **7.P.2.2:** Objects that have potential energy do not use their energy until they move. That is why it is called “potential” energy. Potential means that something is capable of becoming active. Any object that can move to a lower place has the potential to do work on the way down, such as a marble rolling down a driveway. Objects also store energy in motion. A moving mass can certainly exert forces, as you would quickly observe if someone ran into you during a basketball game. Energy of motion is called kinetic energy. Energy appears in different forms, such as motion and heat. Energy can travel in different forms, such as light, sound or electricity. The workings of the universe plus all of present day technology can be viewed from the perspective of energy flowing from one place to another and changing back and forth from one form to another. **7.P.2.3:** Energy can be transferred from one system to another (or from a system to its environment) in different ways: 1) thermally, when a warmer object is in contact with a cooler one; 2) mechanically, when two objects push or pull on each other over a distance; 3) electrically, when an electrical source such as a battery or generator is connected in a complete circuit to an electrical device; or 4) by electromagnetic waves. Energy is one of the fundamental building blocks of our universe. Energy can change from one form to another, although in the process some energy is always converted to heat. Some systems transform energy with less loss of heat than others. Electrical energy can be produced from a variety of energy sources and can be transformed into almost any other form of energy. Batteries store energy and transfer energy to components in a circuit. In the battery the energy comes from chemical reactions. Electricity is important because we can use it to make so many things work (electrical energy). For example, a bulb converts electrical energy into light energy and a speaker converts it into sound energy. The electrical energy generated by windmills, waterfalls and power plants is actually a secondary source of energy. To produce electricity, a heat source is needed to create the conditions in which electrical currents form. In effect, the primary source of electrical energy is the heat generated by burning fossil fuels, water power and wind power. A natural form of electrical energy can be seen in the lightning that appears during storms. Solar energy, water and wind power are sources of green energy—meaning they do not pollute the environment*. Note: It is not necessary to investigate nuclear energy.* |

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| **Public Schools of Robeson County****7TH Grade Science Curriculum Unit 8****Energy: Conservation and Transfer** | **Strand: Physical Science** **Clarifying Objective: 7.P.2** **Days: 7**  **Dates: Apr. 13 – Apr. 21** |

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| **Essential Standard** | **Clarifying Objectives** |
| **7.P.2** Understand forms of energy, energy transfer, and transformation and conservation in mechanical systems. | **7.P.2.4** Explain how simple machines such as inclined planes, pulleys, pulleys, levers, and wheel and axles are used to create mechanical advantage and increase efficiency |
| **Literacy Standards** |
| **Reading Standard**: **RI 7.1:** Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. **Writing Standard**: **W.7.2:** Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. **W.7.5:** Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation. **W.7.6:** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. |
| **Technology Standards** |
| **7.RP.1.1** – Implement a collaborative research process activity that is group selected. **7.SE.1.1** – Apply ethical behavior (copyright, not plagiarizing, proper netiquette) when using resources. |
| **Essential Questions** |
| * How are simple machines used to create mechanical advantage and increase efficiency?
 |
| **Students Will Be Able To:** | **Students Will Know:** |
| * Identify the simple machines that make a compound machine
* Explain the way energy is transferred in a machine
* Evaluate the mechanical advantage provided by each simple machine
* Analyze the differenct between ideal mechanical advantage with actual mechanical advantage
 | * A machine is a device that make work easier by changing the size or direction of a force
* A simple machine only has one movement and include: inclined plane, wheel and axle, pulley and lever
* Compound machines combine simple machines
* Machines transform energy
* Mechanical advantage is the number of times the machine multiplies force
* Efficiency is ability to convert work and is a ratio of output work to input work
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| **Graphic Organizer** |
| https://my.hrw.com/nsmedia/intgos/html/igo.htm |
| **Assessments/Probes** |
| **Formative Assessment**Bell Work[Physical Science Assessment Probe](https://drive.google.com/drive/search?q=Science%20Assessment%20probes)Volume 1Probes 39-45 (pages 181-207 | **Summative Assessment**Teacher made assessmentsQuizzesDiagramming and labeling |
| **Vocabulary** |
| * Machine
* Lever
* Pulley
* Wedge
* Screw
* Fulcrum
* Wheel and axle
* Inclined plane
 | * Compound Machine
* Mechanical Advantage
* Efficiency
* Effort Force
* Resistant Force
* Input/output Force
* Robotics
* Nanotechnology
 |
| **Resources** |
| <http://www.learningscience.org/psc2bmotionforces.htm><http://sciencespot.net/Pages/kdzphysics2.html><http://wwwscience-class.net/Physics/Physics.htm><http://www.thinkingfountain.org/m/motionmachine/motionmachine.html>Quizlet |
| **Unpacking:****7.P.2.4:** A machine is a device that makes work easier by changing the size or direction of a force. When you use a machine, you do the work on the machine, and the machine does the work on something else. Mechanical advantage is the number of times the machine multiplies force. Ideal Mechanical Advantage (IMA) is what is desired of a machine, where Actual Mechanical Advantage (AMA) is what the machine actually does. A lever is a simple machine that has a bar that pivots at a fixed point called a fulcrum. A pulley is a simple machine that consists of a wheel over which a rope, chain, or wire passes. A simple machine that consists of two circular objects of different sizes is known as a wheel and axle. The mechanical advantage of a wheel and axle is the radius of the wheel divided by the radius of the axle. A simple machine that is a straight, slanted surface, and facilitates the raising of loads is an inclined plane. A compound machine consists of two or more simple machines put together. In fact, most machines are compound machines. Some examples are a pair of scissors and a bicycle.  |