Verona Public School District
Curriculum Overview

7th Grade Science

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Curriculum Developed:
Winter 2012
July 2016
Revised Summer 2017
Revised Summer 2018

Board Approval Date:
March 27, 2012
August 30, 2016
August 29, 2017
October 9, 2018

Verona Public Schools
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Verona Public Schools Mission Statement:

In partnership with a supportive community, we inspire our students to be creative, critical thinkers and compassionate global citizens through dynamic teaching, meaningful curricula, and enriching experiences.

Course Description:

The 7th grade science curriculum provides "opportunities for students to engage directly with natural phenomena, tools of science, real-world problems and technical and design challenges. The course provides an instructional framework to help all students develop age-appropriate scientific habits of mind while building on students' prior knowledge and experiences and allowing them to apply knowledge and problem solving strategies in new contexts," (STC, 2012).

The 7th grade science program makes use of three Science and Technology Centers kits: **Weather and Climate Systems; Matter and Its Interactions, and Ecosystem Interactions**. In Weather and Climate Systems, students apply content knowledge and engineering practices to better understand and predict the weather. They will create a design solution and forecast the weather to minimize the impact of a storm on people's lives and for their protection. As a unit assessment students use provided weather data to determine if they will have a day off from school due to weather conditions. For the Matter and Its Interactions unit, students utilize content knowledge to design a method to remove impurities from rock salt, a practice that allows us to have salt for our food. As part of the unit assessment, students demonstrate content knowledge and science and engineering practices to design an eco- and pet-friendly cold pack. The Ecosystems and their Interactions asks students to answer the question, "How do organisms interact with one another and their environments?" Students will explore the cycling of matter and the flow of energy in ecosystems, the relationships among organisms, population dynamics, and natural selection. The unit culminates with an investigation of human impact on ecosystems.

Prerequisite(s):

6th Grade Science

Standard 8: Technology Standards

8.1: Educational Technology: *All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.*	**8.2: Technology Education, Engineering, Design, and Computational Thinking - Programming:** *All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.*
A. Technology Operations and Concepts B. Creativity and Innovation C. Communication and Collaboration D. Digital Citizenship E. Research and Information Fluency **X** F. Critical thinking, problem solving, and decision making	A. The Nature of Technology: Creativity and Innovation B. Technology and Society C. Design D. Abilities for a Technological World E. Computational Thinking: Programming

SEL Competencies and Career Ready Practices

Social and Emotional Learning Core Competencies: *These competencies are identified as five interrelated sets of cognitive, affective, and behavioral capabilities*	**Career Ready Practices:** *These practices outline the skills that all individuals need to have to truly be adaptable, reflective, and proactive in life and careers. These are researched practices that are essential to career readiness.*
Self-awareness: The ability to accurately recognize one's emotions and thoughts and their influence on behavior. This includes accurately assessing one's strengths and limitations and possessing a well-grounded sense of confidence and optimism.	**X** CRP2. Apply appropriate academic and technical skills. CRP9. Model integrity, ethical leadership, and effective management. CRP10. Plan education and career paths aligned to personal goals.
Self-management: The ability to regulate one's emotions, thoughts, and behaviors effectively in different situations. This includes managing stress, controlling impulses, motivating oneself, and setting and working toward achieving personal and academic goals.	CRP3. Attend to personal health and financial well-being. **X** CRP6. Demonstrate creativity and innovation. **X** CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP11. Use technology to enhance productivity.
Social awareness: The ability to take the perspective of and empathize with others from diverse backgrounds and cultures, to understand social and ethical norms for behavior, and to recognize family, school, and community resources and supports.	CRP1. Act as a responsible and contributing citizen and employee. CRP9. Model integrity, ethical leadership, and effective management.
Relationship skills: The ability to establish and maintain healthy and rewarding relationships with diverse individuals and groups. This includes communicating clearly, listening actively, cooperating, resisting inappropriate social pressure, negotiating conflict constructively, and seeking and offering help when needed.	**X** CRP4. Communicate clearly and effectively and with reason. CRP9. Model integrity, ethical leadership, and effective management. CRP12. Work productively in teams while using cultural global competence.
Responsible decision making: The ability to make constructive and respectful choices about personal behavior and social interactions based on consideration of ethical standards, safety concerns, social norms, the realistic evaluation of consequences of various actions, and the well-being of self and others.	CRP5. Consider the environmental, social, and economic impact of decisions. CRP7. Employ valid and reliable research strategies. **X** CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP9. Model integrity, ethical leadership, and effective management.

Standard 9: 21st Century Life and Careers

9.1: Personal Financial Literacy: *This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.*	**9.2: Career Awareness, Exploration & Preparation:** *This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.*	**9.3: Career and Technical Education:** *This standard outlines what students should know and be able to do upon completion of a CTE Program of Study.*
A. Income and Careers B. Money Management C. Credit and Debt Management D. Planning, Saving, and Investing E. Becoming a Critical Consumer F. Civic Financial Responsibility G. Insuring and Protecting	A. Career Awareness (K-4) **X** B. Career Exploration (5-8) C. Career Preparation (9-12)	A. Agriculture, Food & Natural Res. B. Architecture & Construction C. Arts, A/V Technology & Comm. D. Business Management & Admin. E. Education & Training F. Finance G. Government & Public Admin. H. Health Science I. Hospital & Tourism J. Human Services K. Information Technology L. Law, Public, Safety, Corrections & Security M. Manufacturing N. Marketing **X** O. Science, Technology, Engineering & Math P. Transportation, Distribution & Log.

Course Materials

Core Instructional Materials: *These are the board adopted and approved materials to support the curriculum, instruction, and assessment of this course.*	**Differentiated Resources**: *These are teacher and department found materials, and also approved support materials that facilitate differentiation of curriculum, instruction, and assessment of this course.*

• STC Kits:
  o Weather and Climate Systems
  o Matter and Its Interactions
  o Ecosystem Interactions
• Chromebooks
	• CK12.org TWIG Videos
	• Brain Pop Kahoot
	• YouTube Education Science Flix's- videos and nonfiction reading passages
	• Lesson Links form Carolina https://ssec.si.edu/ecosystems-and-their-interactions AAAS Science Assessment http://assessment.aaas.org/ Use to create up to date standards based formative and summative assessments.
	• NGSS Performance tasks: https://www.nextgenscience.org/classroom-sample-assessment-tasks
	• NGSS Assessment Portal: https://ngss-assessment.portal.concord.org/
	• Interactives https://concord.org/stem-resources/grade-level/middle-school
	• NewsEla- nonfiction reading passages: https://newsela.com/
	• PHet simulations: https://phet.colorado.edu/
	• Gizmo simulations:

HB Whitehorne 7th Grade Science

Topic:Earth's Systems
Unit: Weather and Climate

Unit Duration: 50 days

Stage 1: Desired Results

Established NGSS Goals:

MS-ESS2-4. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. [Clarification Statement: Emphasis is on the ways water changes its state as it moves through the multiple pathways of the hydrologic cycle. Examples of models can be conceptual or physical.] [Assessment Boundary: A quantitative understanding of the latent heats of vaporization and fusion is not assessed.]

MS-ESS2-5. Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions. [Clarification Statement: Emphasis is on how air masses flow from regions of high pressure to low pressure, causing weather (defined by temperature, pressure, humidity, precipitation, and wind) at a fixed location to change over time, and how sudden changes in weather can result when different air masses collide. Emphasis is on how weather can be predicted within probabilistic ranges. Examples of data can be provided to students (such as weather maps, diagrams, and visualizations) or obtained through laboratory experiments (such as with condensation).] [Assessment Boundary: Assessment does not include recalling the names of cloud types or weather symbols used on weather maps or the reported diagrams from weather stations.]

MS-ESS2-6. Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. [Clarification Statement: Emphasis is on how patterns vary by latitude, altitude, and geographic land distribution. Emphasis of atmospheric circulation is on the sunlight-driven latitudinal banding, the Coriolis effect, and resulting prevailing winds; emphasis of ocean circulation is on the transfer of heat by the global ocean convection cycle, which is constrained by the Coriolis effect and the outlines of continents. Examples of models can be diagrams, maps and globes, or digital representations.] [Assessment Boundary: Assessment does not include the dynamics of the Coriolis effect.]

Science and Engineering Practices

Developing and Using Models
- Develop and use a model to describe phenomena. (MS-ESS2-1),(MS-ESS2-6)
- Develop a model to describe unobservable mechanisms. (MS-ESS2-4)

Planning and Carrying Out Investigations
- Collect data to produce data to serve as the basis for evidence to answer scientific questions or test design solutions under a range of conditions. (MS-ESS2-5)

Analyzing and Interpreting Data
- Analyze and interpret data to provide evidence for phenomena. (MS-ESS2-3)

Constructing Explanations and Designing Solutions
- Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe nature operate today as they did in the past and will continue to do so in the future. (MS-ESS2-2)

Connections to Nature of Science

Scientific Knowledge is Open to Revision in Light of New Evidence
- Science findings are frequently revised and/or reinterpreted based on new evidence. (MS-ESS2-3)

Disciplinary Core Ideas

ESS1.C: The History of Planet Earth
- Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches. (HS.ESS1.C GBE) (secondary to MS-ESS2-3)

ESS2.A: Earth's Materials and Systems
- All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms. (MS-ESS2-1)
- The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future. (MS-ESS2-2)

ESS2.B: Plate Tectonics and Large-Scale System Interactions
- Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart. (MS-ESS2-3)

ESS2.C: The Roles of Water in Earth's Surface Processes
- Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. (MS-ESS2-4)
- The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns. (MS-ESS2-5)
- Global movements of water and its changes in form are propelled by sunlight and gravity. (MS-ESS2-4)
- Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. (MS-ESS2-6)
- Water's movements—both on the land and underground—cause weathering and erosion, which change the land's surface features and create underground formations. (MS-ESS2-2)

ESS2.D: Weather and Climate
- Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. (MS-ESS2-6)
- Because these patterns are so complex, weather can only be predicted probabilistically. (MS-ESS2-5)
- The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. (MS-ESS2-6)

Crosscutting Concepts

Patterns
- Patterns in rates of change and other numerical relationships can provide information about natural systems. (MS-ESS2-3)

Cause and Effect
- Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-ESS2-5)

Scale Proportion and Quantity
- Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small. (MS-ESS2-2)

Systems and System Models
- Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems. (MS-ESS2-6)

Energy and Matter
- Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter. (MS-ESS2-4)

Stability and Change
- Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and processes at different scales, including the atomic scale. (MS-ESS2-1)

Common Core State Standards Connections:

ELA/Literacy –

RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts. **(MS-ESS2-2),(MS-ESS2-3),(MS-ESS2-5)**

RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). **(MS-ESS2-3)**

RST.6-8.9 Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. **(MS-ESS2-3),(MS-ESS2-5)**

WHST.6-8.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. **(MS-ESS2-2)**

WHST.6-8.8 Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources. **(MS-ESS2-5)**

SL.8.5 Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points. **(MS-ESS2-1),(MS-ESS2-2),(MS-ESS2-6)**

Mathematics –

MP.2 Reason abstractly and quantitatively. **(MS-ESS2-2),(MS-ESS2-3),(MS-ESS2-5)**

6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. **(MS-ESS2-5)**

6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. **(MS-ESS2-2),(MS-ESS2-3)**

7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. **(MS-ESS2-2),(MS-ESS2-3)**

Transfer Goal:

Students will be able to <u>independently</u> use their learning to **understand the how data can be used to understand weather and climate.**

Students will understand that:

-Radar maps provide information about current weather conditions and can be used to predict future weather events.
-Weather and climate events can be associated with certain geographical locations on a map or globe.
-Images from satellites in space provide information about Earth and its oceans, clouds, and atmosphere.
-Radiated energy from the Sun is a major source of energy for weather phenomena.
-Earth's surface and its atmosphere absorb and reflect the Sun's radiant energy; absorbed heat can be radiated back into the atmosphere.
-Scientists study Earth's structure, history, ecosystems, and natural catastrophic events
-The temperature of Earth's surface affects both the temperature and movement of air above it.
-Temperature affects water's rate of evaporation. The molecules in warm water move faster and can break free of each other more readily to become gaseous water vapor than the molecules in cooler water. As a result, evaporation occurs more readily in warmer water than in cooler water.
-Earth has a finite supply of water that is continuously recycled through the water cycle.
-The Sun's energy drives the water cycle, causing water vapor to rise into the atmosphere through evaporation and then condense into droplets that form clouds. It then falls back to Earth due to the force of gravity.
- Cool air is denser than warm air and has a tendency to sink, creating air masses that are stable.
- As air is warmed, it rises. As air is cooled, it sinks.
- Evaporation is likely to occur when temperatures are increased, while condensation is likely to occur when temperatures are decreased. This is due to the movement of the water molecules.

Essential Questions:

-What do you know about weather and climate on Earth?
-How do different surfaces on Earth warm and cool?
-How can meteorologists use air pressure measurements to predict changes in weather and different types of cloud formations?
-How do water and air move in the atmosphere?
-How do temperature, salinity, and wind affect ocean currents?
-What is a vortex and how does it relate to hurricanes and tornadoes?
-What is a vortex and how does it relate to hurricanes and tornadoes?
-How can weather data and patterns be used to predict future weather events?
-How can severe storms be tracked in order to predict their impact?
-What is climate and how is it determined?
-What data have scientists collected and analyzed to support theories about climate change?
-How does climate change impact Earth's systems?

- The water cycle relies on the heat from the Sun to cause water to evaporate. The water then condenses, forming clouds, and eventually returns to Earth due to the force of gravity.
- Models allow us to view phenomena and change different aspects of it, but they have limitations.
-Rising warm air creates an unstable air mass. Clouds are more to likely to form when air masses are unstable and then rise quickly. When air masses are stable, clouds remain close to Earth's surface.
- The formation of clouds is the result of moist, rising air that condenses when the water vapor in that air reaches its dew point. The dew point is the point in the atmosphere at which the temperature is low enough to cause water vapor to condense into the water droplets that form clouds.
- Air pressure is the force exerted by the weight of air on a surface.
• When air masses of different temperature and humidity meet, convection currents form.
• The upward movement of warm air and the downward movement of cool air form convection currents.
• A simple barometer can be made with a jar, rubber band, balloon, and stick—everyday objects and materials.
• The weather can be predicted by analyzing the barometric pressure.
• When air masses of different temperature and humidity meet, convection currents form.
• Air pressure and weather are related. Knowing the air pressure can help predict the weather.
• The atmosphere is composed of multiple layers. These layers have different properties.
-The variation in angle of sunlight leads to unequal heating.
• Temperature affects the density of water, which causes ocean currents.
• Salty and less-salty masses of water vary in density and cause convection currents in a liquid.
• Trade winds near the equator cause upwelling, or the rising of cold, deep water that is rich in nutrients.
• Differences in temperature and salinity produce ocean currents.
• A tornado watch occurs when weather conditions exist that could cause a tornado to form. A tornado warning occurs when a tornado has been spotted.
• Tornado watches are announced when tornadoes may form, while tornado warnings are announced when a tornado has been spotted. These are announced to the public in many different ways.
• Thunderstorms, tornadoes, and hurricanes are all weather events that have specific characteristics.
• Modern weather forecasting is improving as our technology improves. The technology is constantly changing.
• Many factors that influence climate are latitude, bodies of water, ocean currents, elevation, and mountain ranges.
-It is possible to make climate projections, given the current state of knowledge about climate and how it works.
• Climate projections are reasonable scenarios rather than forecasts.
• Current climate projections show significant, potentially dramatic climate change in U.S. regions over the next century.
• Studying climate change projections lets us consider how best to mitigate climate change and its effects.

Students will know:

-Warm air is less dense than cool air and has a tendency to rise, creating air masses that are unstable.
• Cloud formation is a direct result of air pressure.
• Weather and climate are different from one another, but they are connected.
-A barometer measures air pressure.
- Hurricanes form over warm, tropical waters.
• Hurricane winds move around a central calm zone (eye) surrounded by tall, dark clouds (eyewall).
• A storm surge is produced by water that is pushed ahead of a storm by the force of hurricane winds.
• The effect of a storm surge varies with coastal configuration.
• Dixie Alley is a portion of the southern United States that is predisposed to the formation of tornadoes.
• Local data may be used to predict weather.
• A vortex pattern occurs in both tornadoes and hurricanes.
• A thunderstorm is an electrical disturbance in the atmosphere that includes lightning and thunder.
• A tornado is a violent windstorm that spirals around a rotating column of air, the vortex, and moves in a narrow path over land.
• A hurricane is a massive system of rotating winds that forms over warm tropical waters
• Winds blowing over a liquid's surface create a current.
• The waters of the ocean move in streams called currents.

Students will be able to:

1. Investigate the unequal heating of Earth's surface by planning and carrying out an investigation to collect data about how different materials, water and soil, absorb and release heat.
2. Analyze and interpret their collected data. Consider how these interactions between material and heat relate to weather and climate.
3. Investigate the movement of air and water in the atmosphere, which allows them to obtain a foundational knowledge of air masses. Model the atmospheric process of condensation and evaporation. Create a model of the water cycle, determine the roles that the Sun and gravity play in this cycle. Investigate how surfaces cause the warming and cooling of air above them. Relate this to the formation of clouds and other weather phenomena.
4. Model the movement of air masses as they design an investigation in which they model the collision of types of air masses. Investigate to see how different air pressure conditions relate to the formation of clouds. Create a barometer that they use as they plan and carry out an investigation to determine how air pressure correlates to weather conditions. Recognize the patterns that exist between changing air pressure and certain weather phenomena, such as clouds.
5.Investigate the movement of the ocean currents. Relate the movement of ocean currents to weather and climate.
6: Model a vortex and relate it to the movement of tornadoes and hurricanes.
7: Examine weather maps and look for patterns and relationships in the maps. Analyze and interpret collected data to predict weather events.
8. Apply their observations to weather maps and draw conclusions about the conditions under which clouds and storms form and move.
9.Explore the impacts of severe storms and how the storms are predicted.
10. Explore different ecosystems and related factors that are important in determining the climate of a particular region.

Stage 2: Acceptable Evidence

Transfer Task

Students will explore the data scientists collect related to climate change. Students have been exposed to the uncertainty scientists face in collecting and interpreting data, and they are beginning to develop a sense of what it means to make tentative statements of fact based on data that is imperfect and fragmentary but intelligently collected and analyzed.

Students will explore these concepts by measuring the temperature in an area and then finding a way to represent the data with a single value.

Next, students are presented with and discuss how and why different types of data are collected as evidence of climate change. Each group is assigned or selects a graph of climate data to analyze and interpret.

Students engage in research aimed at a deeper, more contextualized understanding of what the graph means, how its data has been collected, and why the subject under study is important. Then, in Investigation 10.2, students present their research to the class, allowing the whole class to get familiar with different pieces of climate change research.

HB Whitehorne 7th Grade Science

Unit Title / Topic: Matter and Its Interactions | **Unit Duration: 60 Days**

Stage 1: Desired Results

Established NGSS Goals:

MS-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures. [Clarification Statement: Emphasis is on developing models of molecules that vary in complexity. Examples of simple molecules could include ammonia and methanol. Examples of extended structures could include sodium chloride or diamonds. Examples of molecular-level models could include drawings, 3D ball and stick structures, or computer representations showing different molecules with different types of atoms.] [Assessment Boundary: Assessment does not include valence electrons and bonding energy, discussing the ionic nature of subunits of complex structures, or a complete depiction of all individual atoms in a complex molecule or extended structure.]

MS-PS1-2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. [Clarification Statement: Examples of reactions could include burning sugar or steel wool, fat reacting with sodium hydroxide, and mixing zinc with hydrogen chloride.] [Assessment Boundary: Assessment is limited to analysis of the following properties: density, melting point, boiling point, solubility, flammability, and odor.]

MS-PS1-3. Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. [Clarification Statement: Emphasis is on natural resources that undergo a chemical process to form the synthetic material. Examples of new materials could include new medicine, foods, and alternative fuels.] [Assessment Boundary: Assessment is limited to qualitative information.]

MS-PS1-4. Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. [Clarification Statement: Emphasis is on qualitative molecular-level models of solids, liquids, and gases to show that adding or removing thermal energy increases or decreases kinetic energy of the particles until a change of state occurs. Examples of models could include drawings and diagrams. Examples of particles could include molecules or inert atoms. Examples of pure substances could include water, carbon dioxide, and helium.]

MS-PS1-5. Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. [Clarification Statement: Emphasis is on law of conservation of matter and on physical models or drawings, including digital forms, that represent atoms.] [Assessment Boundary: Assessment does not include the use of atomic masses, balancing symbolic equations, or intermolecular forces.]

MS-PS1-6. Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.* [Clarification Statement: Emphasis is on the design, controlling the transfer of energy to the environment, and modification of a device using factors such as type and concentration of a substance. Examples of designs could involve chemical reactions such as dissolving ammonium chloride or calcium chloride.] [Assessment Boundary: Assessment is limited to the criteria of amount, time, and temperature of substance in testing the device.]

Science and Engineering Practices

Developing and Using Models
- Develop a model to predict and/or describe phenomena. (MS-PS1-1),(MS-PS1-4)
- Develop a model to describe unobservable mechanisms. (MS-PS1-5)

Analyzing and Interpreting Data
- Analyze and interpret data to determine similarities and differences in findings. (MS-PS1-2)

Constructing Explanations and Designing Solutions
- Undertake a design project, engaging in the design cycle, to construct and/or implement a solution that meets specific design criteria and constraints. (MS-PS1-6)

Obtaining, Evaluating, and Communicating Information
- Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. (MS-PS1-3)

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence
- Science knowledge is based upon logical and conceptual connections between evidence and explanations. (MS-PS1-2)

Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena
- Laws are regularities or mathematical descriptions of natural phenomena. (MS-PS1-5)

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter
- Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. (MS-PS1-1)
- Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it. (MS-PS1-2),(MS-PS1-3)
- Gases and liquids are made of molecules or inert atoms that are moving about relative to each other. (MS-PS1-4)
- In a liquid, the molecules are constantly in contact with others; in a gas, they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations. (MS-PS1-4)
- Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals). (MS-PS1-1)
- The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter. (MS-PS1-4)

PS1.B: Chemical Reactions
- Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants. (MS-PS1-2),(MS-PS1-3),(MS-PS1-5)
- The total number of each type of atom is conserved, and thus the mass does not change. (MS-PS1-5)
- Some chemical reactions release energy, others store energy. (MS-PS1-6)
- PS3.A: Definitions of Energy
- The term "heat" as used in everyday language refers both to thermal energy (the motion of atoms or molecules within a substance) and the transfer of that thermal energy from one object to another. In science, heat is used only for this second meaning; it refers to the energy transferred due to the temperature difference between two objects. (secondary to MS-PS1-4)
- The temperature of a system is proportional to the average internal kinetic energy and potential energy per atom or molecule (whichever is the appropriate building block for the system's material). The details of that relationship depend on the type of atom or molecule and the interactions among the atoms in the material. Temperature is not a direct measure of a system's total thermal energy. The total thermal energy (sometimes called the total internal energy) of a system depends jointly on the temperature, the total number of atoms in the system, and the state of the material. (secondary to MS-PS1-4)

ETS1.B: Developing Possible Solutions
- A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (secondary to MS-PS1-6)

ETS1.C: Optimizing the Design Solution
- Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of the characteristics may be incorporated into the new design. (secondary to MS-PS1-6)
- The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution. (secondary to MS-PS1-6)

Crosscutting Concepts

Patterns
- Macroscopic patterns are related to the nature of microscopic and atomic-level structure. (MS-PS1-2)

Cause and Effect
- Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-PS1-4)

Scale, Proportion, and Quantity
- Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small. (MS-PS1-1)

Energy and Matter
- Matter is conserved because atoms are conserved in physical and chemical processes. (MS-PS1-5)
- The transfer of energy can be tracked as energy flows through a designed or natural system. (MS-PS1-6)

Structure and Function
- Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used. (MS-PS1-3)

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology
- Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. (MS-PS1-3)

Influence of Science, Engineering and Technology on Society and the Natural World
- The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time. (MS-PS1-3)

Common Core State Standards Connections:

ELA/Literacy –

RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions **(MS-PS1-2),(MS-PS1-3)**

RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. **(MS-PS1-6)**

RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). **(MS-PS1-1),(MS-PS1-2),(MS-PS1-4),(MS-PS1-5)**

WHST.6-8.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. **(MS-PS1-6)**

WHST.6-8.8 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. **(MS-PS1-3)**

Mathematics –

MP.2 Reason abstractly and quantitatively. **(MS-PS1-1),(MS-PS1-2),(MS-PS1-5)**

MP.4 Model with mathematics. **(MS-PS1-1),(MS-PS1-5)**

6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems. **(MS-PS1-1),(MS-PS1-2),(MS-PS1-5)**

6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. **(MS-PS1-4)**

8.EE.A.3 Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. **(MS-PS1-1)**

6.SP.B.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots. **(MS-PS1-2)**

6.SP.B.5 Summarize numerical data sets in relation to their context **(MS-PS1-2)**

Transfer Goal:

Students will be able to <u>independently</u> use their learning to understand,explain and make use of their knowledge of how matter and its interactions affect their everyday life

Students will understand that:

1. Everything in the universe is made of matter, which has mass and volume.

-States of matter can be observed and measured.

• Matter is made up of particles too small to be seen.

• Matter expands when heated.

• Mixing two substances may result in a new substance.

• Energy can be transferred in various ways and between objects.

2. Patterns in macroscopic observations may suggest similar atomic-level structures.

• Substances have physical and chemical properties that can be used to describe and identify them.

• Data collected about the properties of substances before and after they interact can be used to determine if a new substance is formed.

• Physical properties are characteristics that distinguish one type of matter from another.

• Solubility is a physical property of matter.

- A change in the properties of substances is related to the rearrangement of atoms.

Essential Questions:

- What can properties of matter help you determine?
- How can density be used to identify a substance and predict how it will behave under different conditions?
- How is energy related to physical changes in matter? How can you use a model to describe the composition of matter?
- How can mixtures be separated?
- How can the properties of matter be used to determine if a chemical reaction has occurred?
- What is the relationship between changes in substances and changes in thermal energy?
- What happens to matter in a chemical reaction?
- How are synthetic compounds made and used?
- How can we use our knowledge of matter and its interactions to solve problems?

• Reactivity is a chemical property of matter. • Unknown substances can be identified based on their characteristic physical and chemical properties. • Different types of investigations can be performed to demonstrate different phenomena about characteristic physical and chemical properties of matter. 3. Density is a physical property that can be used to distinguish substances. • Different substances possess different densities. • The approximate density of a liquid can be determined by observing the behavior of objects of known densities in the Liquid. 4. Models can be used to describe unobservable mechanisms. • Thermal energy is the motion of atoms and molecules in a substance. • Matter and mass are conserved in physical processes. • An increase in the temperature of a substance increases the kinetic energy of the particles. 5. Substances are made from different types of atoms that combine in various ways to form molecules. • The periodic table organizes elements by their similarities. • Matter is composed of molecules, which can be viewed as models. • Matter is composed of molecules and compounds, which can be viewed as models. • Elements can be classified by their characteristic properties. • The periodic table groups and classifies elements by their similarities and molecular structure.	

Students will know:

Dissolve	Mass
Liquid	Model
Effervescent	Characteristic property
Mixture	Density
Element	Boiling
Filter	Boiling point
Solid	Celsius
Gas	Condensation
Soluble	Melting point
Insoluble	Dependent variable
Controlled experiment	Phase change
Dependent variable	Freezing
Independent variable	Sublimation
Modification	Freezing point
Reactivity	Atom
Variable	Chemical reaction
Atom	Crystals
Particles	Element
Chemical change	Heterogeneous
Physical change	Homogeneous
Chemical property	Mixture
Physical property	Pure substance
Mass	Separation
Matter	Component Mixture
Volume	Compound
Biochemistry	Crystals
Materials science	Atom
Organic chemistry	Molecule
Synthetic compound	Chemical bond
	Chemical change
	Product
	Chemical reaction
	Reactant
	Kinetic energy
	Law of conservation of matter

Students will be able to:

• Organize, analyze, and interpret data about characteristic properties of substances before and after they interact.
• Use experimental evidence to argue that a new substance forms and a chemical reaction occurs.
• Plan and carry out an investigation that uses characteristic properties to identify substances in an unknown mixture.
Calculate and compare the densities of various regular solids
• Use density to predict whether objects will float or sink in liquids.
• Infer the relative density of a liquid from the behavior of solids of known densities.
• Explain how density affects the behavior of objects in the real world.
• Construct preliminary explanations and develop a model to predict and describe phenomena related to phase changes.
• Plot, analyze, and interpret a graph of measurements collected from heating ice water.
• Develop models of phase changes that describe changes in particle motion, temperature, and state of matter when thermal energy is added.
• Plan and carry out an investigation into the mass of water when it melts in a closed container.
• Develop models of phase changes that describe changes in particle motion, temperature, and state of matter when thermal energy is added or removed.
• Describe how atoms combine with each other in various ways to form substances.
• Describe how the atomic-level structure of substances relate to physical changes and chemical reactions.
• Relate real-life events to the chemical reactions involved.
• Prepare an appropriate diagram using models to represent electrolysis.
• Identify the products of the electrolysis of water.
• Investigate how changing the mass of a component relates to changes in thermal energy.
• Apply understanding of a scientific process to design, construct, and test a device that releases thermal energy.
• Conduct an investigation to compare the mass of reactants and the mass of products.
• Determine whether the law of conservation of mass can be applied to chemical reactions.
• Explain why synthetic compounds are important and useful.

Stage 2: Acceptable Evidence

Transfer Task

The unit concludes with a two-part assessment.

1) The first part is a Performance Assessment, in which students demonstrate their content knowledge and science and engineering skills to design a cold pack using one of five chemical compounds. Students must set up their own experiments and justify their selection based on safety for humans, safety for the environment, and cost of material per gram.
2) In the second part, students complete a Written Assessment covering the performance expectations, disciplinary core ideas, crosscutting concepts, and science and engineering practices covered in this unit.

Alternate for part one:

Students design and carry out experiments which demonstrate a physical change. These experiments must detail the change, how the change occurred, what type of evidence was used to prove a change. Also they will include the physical and chemical properties of the reactants then compare these with the product.

HB Whitehorne 7th Grade Science

Unit Title / Topic: Ecosystem Interactions | **Unit Duration: 60 days**

Stage 1: Desired Results

Established NGSS Goals:

MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. [Clarification Statement: Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.]

MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. [Clarification Statement: Emphasis is on predicting consistent patterns of interactions in different ecosystems in terms of the relationships among and between organisms and abiotic components of ecosystems. Examples of types of interactions could include competitive, predatory, and mutually beneficial.]

MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. [Clarification Statement: Emphasis is on describing the conservation of matter and flow of energy into and out of various ecosystems, and on defining the boundaries of the system.] [Assessment Boundary: Assessment does not include the use of chemical reactions to describe the processes.]

MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. [Clarification Statement: Emphasis is on recognizing patterns in data and making warranted inferences about changes in populations, and on evaluating empirical evidence supporting arguments about changes to ecosystems.]

MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.* [Clarification Statement: Examples of ecosystem services could include water purification, nutrient recycling, and prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations.]

Science and Engineering Practices

Developing and Using Models
- Develop a model to describe phenomena. (MS-LS2-3)

Analyzing and Interpreting Data
- Analyze and interpret data to provide evidence for phenomena. (MS-LS2-1)

Constructing Explanations and Designing Solutions
- Construct an explanation that includes qualitative or quantitative relationships between variables that predict phenomena. (MS-LS2-2)

Engaging in Argument from Evidence
- Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. (MS-LS2-4)
- Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. (MS-LS2- 5)

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence
- Science disciplines share common rules of obtaining and evaluating empirical evidence. (MS-LS2-4)

Disciplinary Core Ideas

LS2.A: Interdependent Relationships in Ecosystems
- Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. (MS-LS2-1)
- In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction. (MS-LS2- 1)
- Growth of organisms and population increases are limited by access to resources. (MS-LS2-1)
- Similarly, predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory, and mutually beneficial interactions vary across ecosystems, the patterns of interactions of organisms with their environments, both living and nonliving, are shared. (MS-LS2-2)

LS2.B: Cycle of Matter and Energy Transfer in Ecosystems
- Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. (MS-LS2-3)

LS2.C: Ecosystem Dynamics, Functioning, and Resilience
- Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations. (MS-LS2-4)
- Biodiversity describes the variety of species found in Earth's terrestrial and oceanic ecosystems. The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health. (MS-LS2-5) LS4.D: Biodiversity and Humans
- Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling. (secondary to MS-LS2-5)

ETS1.B: Developing Possible Solutions
- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (secondary to MS-LS2-5)

Crosscutting Concepts

Patterns
- Patterns can be used to identify cause and effect relationships. (MS-LS2-2)

Cause and Effect
- Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-LS2-1)

Energy and Matter
- The transfer of energy can be tracked as energy flows through a natural system. (MSLS2-3)

Stability and Change
- Small changes in one part of a system might cause large changes in another part. (MSLS2-4),(MS-LS2-5)

Connections to Engineering, Technology, and Applications of Science

Influence of Science, Engineering, and Technology on Society and the Natural World
- The use of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time. (MS-LS2-5)

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems
- Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. (MS-LS2-3)

Science Addresses Questions About the Natural and Material World
- Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes. (MS-LS2-5)

Common Core State Standards Connections:

ELA/Literacy –

RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts**. (MS-LS2-1),(MS-LS2-2),(MS-LS2-4)**

RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). **(MS-LS2-1)**

RST.6-8.8 Distinguish among facts, reasoned judgment based on research findings, and speculation in a text. **(MS-LS2-5)**

RI.8.8 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. **(MS-LS-4),(MS-LS2-5)**

WHST.6-8.1 Write arguments to support claims with clear reasons and relevant evidence. **(MS-LS2-4)**

WHST.6-8.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. **(MS-LS2-2)**

WHST.6-8.9 Draw evidence from literary or informational texts to support analysis, reflection, and research. **(MS-LS2-2),(MS-LS2-4)**

SL.8.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly. **(MS-LS2-2)**

SL.8.4 Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation. **(MS-LS2-2)**

SL.8.5 Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points. **(MS-LS2-3)**

Mathematics –

MP.4 Model with mathematics. **(MS-LS2-5)**

6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems. **(MS-LS2-5)**

6.EE.C.9 Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. **(MS-LS2-3)**

6.SP.B.5 Summarize numerical data sets in relation to their context. **(MS-LS2-2)**

Transfer Goal:

Students will be able to <u>independently</u> use their learning of ecosystems to understand, explain and make use of their knowledge on how living and nonliving things interact and affect their everyday lives.

Students will understand that:

-Ecosystems have many different parts and play a role in the survival of all living things.
-Ecosystems ar diverse and include many living and nonliving components.
-Human can have a positive and/or negative impact on ecosystems and their parts.
-Living things share a certain set of characteristics.
-The environment contains biotic and abiotic components.
-All living things play a role in populations, communities, ecosystems, etc.
-Different organisms have different needs and ecosystems provide resources in different ways.
-Environmental factors influence growth of plants and animals.
-The availability of resources impacts individual organisms and populations of organisms in an ecosystems.
-Both carbon and nitrogen are essential to the survival of living things and organisms obtain these elements in different ways.
-Both carbon and nitrogen move in continuous cycles through both biotic and abiotic components of an ecosystem.
-The sun is the driving force behind all cycles of matter including water.
-Energy flows from one organism to the next, starting with the Sun.
-Organisms impact one another in various ways as energy is transferred from one trophic level to another.
-Different types of relationships exist between organisms across all types of ecosystems.
-There are patterns in the types of interactions that organisms have.

Essential Questions:

How do organisms interact with one another and their environments?
What do you already know about ecosystems and their interactions?
How are ecosystems organized?
How does the availability of resources affect a population of organisms?
How do organisms get matter to grow and repair their bodies?
How do organisms get energy to live and grow?
How do organisms interact with one another?
How do changes to the physical or biological components of an ecosystem affect a population?
How does natural selection change a population over time?
What is biodiversity and why is it important?
How can human impact in the environment be monitored and minimized?
What have you learned about ecosystems and their interactions?

-Ecosystems are dynamic and change is a healthy part of an ecosystem and can be natural or man-made. -Different organisms are adapted to meet their needs for different resources and differences in traits allow for the survival of certain organisms in a population. -Without biodiversity, ecosystems can collapse and ecosystem services can be lost. -Some human activities have broad impacts, positive and negative, across the Earth.	
Students will know: Ecosystem, Community, Population, Organism, Habitat, Energy, Matter, Biotic, Abiotic, Biosphere, species, constraint, criteria, resources, carrying capacity, population density, Scientific method vocabulary, carbon, nitrogen, water cycle terms. Trophic levels, cellular respiration, photosynthesis, nitrification, nitrogen fixation, autotroph, heterotroph, food chain terms, food web terms, chemosynthesis, consumer, decomposers, producers, herbivore, carnivore, competition, predator, prey, commensalism, mutualism, parasitism, predation, herbivory, climax species, pioneer species, primary succession, secondary succession, invasive species, variation, mutation, natural selection, biodiversity	**Students will be able to:** 1.Uncover what they already know about ecosystems and various roles living and nonliving things play in an ecosystems growth and development. 2.Describe the characteristics of life, the difference between biotic and abiotic and the habitats of different living things. 3.Plan and carry out an investigation on the differing availability of resources in an ecosystem. 4.Model the movement of water, carbon, and nitrogen through ecosystems and determine their benefits and limitations. 5.Investigate the roles of cellular respiration and photosynthesis with the movement of carbon. 6.Use evidence to create food webs and food chains that demonstrate the flow of energy and relationships between organisms in an ecosystem. 7.Design, create, and test a model that displays the relationship of competition for resources and predator/prey relationships. 8.Observe natural ecological patterns formed by succession. 9.Use physical models of prey coloration to explore the process of natural selection. 10.Recognize what biodiversity refers to and why it is important. 11.Recognize how people impact ecosystems and why it is important to monitor this impact. 12. Plan, research, and carry out an investigation on a particular ecological problem and present collected data and possible solutions to classmates with a poster presentation.

Stage 2: Acceptable Evidence

Transfer Task

The unit concludes with students taking on the role as stakeholder of a local ecosystem and the many services it offers the world. Students will be required to research their ecosystem and investigate a particular threat to that ecosystem. Once the students have found a conflict with their ecosystem they are to research, design, create, and present a poster presentation identifying and explaining the specifics of the ecological problem and provide possible solutions. Questions students will need to answer in their poster presentation include the the ecological concern is, how does it affect the Earth, what solutions are there to stopping the threat, and how does this impact them as a stakeholder.