NEW HANOVER TOWNSHIP CURRICULUM

GRADE 6-8

New Hanover Township School
Content Area: Science

School Mission: Science 6-8 Students will...

- Develop autonomy in using the Scientific Method to solve problems and adjust hypotheses.
- Use their learning to design original experiments, investigations, reports, and models.

- Create written explanations and reflections on scientific facts and theories.
- Overcome such misconceptions and habits of thinking as humans have no impact on the Earth, Earth systems are similar in length to human life-spans, and correlation means causation.
- Overcome such key challenges as self-reflection as models fail, representing natural phenomena with mathematical expression, and organizing information to find patterns and systems.

21st Century Learning The Partnership for 21st Century Learning (P21)
www.P21.org

To help practitioners integrate skills into the teaching of core academic subjects, P21 has developed a unified, collective vision for learning known as the Framework for 21st Century Learning. This Framework describes the skills, knowledge and expertise students must master to succeed in work and life; it is a blend of content knowledge, specific skills, expertise and literacies. Every 21st century skills implementation requires the development of core academic subject knowledge and understanding among all students. Those who can think critically and communicate effectively must build on a base of core academic subject knowledge. Within the context of content knowledge instruction, students must also learn the essential skills for success in today's world, such as critical thinking, problem solving, communication and collaboration. When a school or district builds on this foundation, combining the entire Framework with the necessary support systems—standards, assessments, curriculum and instruction, professional development and learning environments—students are more engaged in the learning process and graduate better prepared to thrive in today's global economy. Mastery of key subjects and 21st century themes is essential to student success. Key subjects include English, reading or language arts, world languages, arts, mathematics, economics, science, geography, history, government and civics. In addition, schools must promote an understanding of academic content at much higher levels by weaving 21st century interdisciplinary themes into core subjects:

- Global Awareness
- Financial, Economic, Business and Entrepreneurial Literacy
- Civic Literacy
- Health Literacy
- Environmental Literacy Learning and Innovation

Skills Learning and innovation skills are what separate students who are prepared for increasingly complex life and work environments in today's world and those who are not. They include:

- Creativity and Innovation
- Critical Thinking and Problem Solving
- Communication and Collaboration Information, Media and Technology Skills

Today, we live in a technology and media-driven environment, marked by access to an abundance of information, rapid changes in technology tools and the ability to collaborate and make individual contributions on an unprecedented scale. Effective citizens and workers must be able to exhibit a range of functional and critical thinking skills, such as:

- Information Literacy
- Media Literacy
- ICT (Information, Communications and Technology) Literacy Life and Career Skills

Today's life and work environments require far more than thinking skills and content knowledge. The ability to navigate the complex life and work environments in the globally competitive information age requires students to pay rigorous attention to developing adequate life and career skills, such as:

- Flexibility and Adaptability
- Initiative and Self-Direction
- Social and Cross-Cultural Skills
- Productivity and Accountability
- Leadership and Responsibility

Developing a comprehensive framework for 21st century learning requires more than identifying specific skills, content knowledge, expertise and literacies. An innovative support system must be created to help students master the multi-dimensional abilities that will be required of them. The Partnership has identified five critical support systems to ensure student mastery of 21st century skills:

- 21st Century Standards
- Assessments of 21st Century Skills
- 21st Century Curriculum and Instruction
- 21st Century Professional Development
- 21st Century Learning Environments

NGSS Big Idea:

Framework are as follows:

1. *Patterns*. Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them.

2. *Cause and effect:* Mechanism and explanation. Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the

mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.

3. *Scale, proportion, and quantity.* In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance.

4. *Systems and system models.* Defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering.

5. *Energy and matter:* Flows, cycles, and conservation. Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.

6. *Structure and function.* The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.

7. *Stability and change.* For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study.

Suggestions for Differentiation

A variety of teaching strategies and models can aid in reaching diverse learning styles in groups of students and strengthen any learning weaknesses a group may present. Strategies are general approaches to teaching that all individuals use. Tendencies with these choices form our teaching style. For example, planning, organization, communication, feedback, monitoring, questioning, collaborative grouping, review or closure, and climate support increasing motivation and critical thinking. Models are ways to present content. One's tendency to use one model more frequently is also reflective of an individual's style. Guided discovery model, concept attainment model, integrative model, problem based learning, direct instruction, and lecture-discussion model can be used based on content, teaching style, and student needs. When reteaching or problem solving, choosing a different teaching model may provide new ways to reach students. Overall, it is important for classrooms to experience a wide variety of learning models and strategies, encouraging diversity, awareness, and strengthening different skills.

Summarized from Strategies and Models for Teaching:Teaching Content and Thinking Skills Sixth Edition by Paul Eggen and Don Kauchak

Physical Science: Matter and its Interactions

Goals by the end of 8th grade:

MS-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures.

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.

MS-PS1-3. Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.

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.

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.

MS-PS1-6. Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.*

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

Interdisciplinary Connections:

Writing CCSS.ELA-LITERACY.WHST.6-8.1-10

Science and Technical Subjects CCSS.ELA-LITERACY.RST.6-8.1-10

History/Social Studies CCSS.ELA-LITERACY.RH.6-8.1-10

Understandings:	**Essential Questions:**
■ Matter is made of atoms that have properties and specific interactions.	■ Why do substances behave certain ways? ■ What is a chemical reaction? ■ Why are chemicals important to people?

Students will know (DCIs)...

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.

- Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals).
- Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it.
- 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.
- Gases and liquids are made of molecules or inert atoms that are moving about relative to each other.
- The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter.
- 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.
- 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.
- 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.
- The total number of each type of atom is conserved, and thus the mass does not change.
- Some chemical reactions release energy, others store energy.
- A solution needs to be tested, and then modified on the basis of the test results, in order to improve it.
- 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.
- 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.

Assessment

Performance Tasks-	**Other Evidence**
i. Students develop models of atomic composition of simple molecules and extended structures that vary in complexity. Describe relationships between components. Describe substances and the behavior of it depends on structures at atomic levels. ii. Analyze relationships substances using data about physical and chemical properties before and after they interact (e.g. density, melting point, boiling point, solubility, flammability, odor). Support claim of a chemical reaction. iii. Obtain information on the relationship between synthetic substances and natural resources, society's need for the material, chemical processes used, bias of materials, and create a visual report. iv. Create a model of particle motion, system, kinetic energy, thermal energy, temperature, and pure substances. Generalize about the relationship between particles, energy, forces, and pressure. v. Create a model for the conservation of matter. Identify reactants and products in a chemical reaction, the relationships between substances in an interaction. vi. Given a problem of heating or cooling, design a solution under given constraints. Adjust design through testing.	Lab Experiments Quizzes MAP Testing NJASK and other state testing

Learning Activities

Lab Demonstrations and Experiments
Journal Reflections
Textbook- Reading responses
Websites
Videos and Discussions
Exit Tickets
Teacher Observations

Guiding Prompts for Learning Activities:
W = help the students know where the unit is going and what is expected? Help the teacher know where the students are coming from (prior knowledge, interests)?
H = hook all students and hold their interest?
E = equip students, help them experience the key ideas, and explore the issues?
R = provide opportunities to rethink and revise their understandings and work?
E = allow students to evaluate their work and its implications?
T = be tailored (personalized) to the different needs, interests, abilities of learners
O = be organized to maximize initial and sustained engagement as well as effective learning?

Unit: Motion and Stability: Forces and Interactions

Goals by the end of 8th grade:

MS-PS2-1. Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.*
MS-PS2-2. Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.
MS-PS2-3. Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.
MS-PS2-4. Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.
MS-PS2-5. Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

Interdisciplinary Connections:
Writing CCSS.ELA-LITERACY.WHST.6-8.1-10
Science and Technical Subjects CCSS.ELA-LITERACY.RST.6-8.1-10
History/Social Studies CCSS.ELA-LITERACY.RH.6-8.1-10

Understandings:	**Essential Questions:**
■ Laws govern forces and interactions. ■ Mathematical calculations can be applied to forces and interactions.	■ Why are forces important to us? ■ How can we prove a statement true or false using the scientific method?

Students will know (DCIs)…

- For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction (Newton's third law).
- The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change.
- The greater the mass of the object, the greater the force needed to achieve the same change in motion. For any given object, a larger force causes a larger change in motion.
- All positions of objects and the directions of forces and motions must be described in an arbitrarily chosen reference frame and arbitrarily chosen units of size. In order to share information with other people, these choices must also be shared.
- Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects.
- Gravitational forces are always attractive. There is a gravitational force between any two masses, but it is very small except when one or both of the objects have large mass—e.g., Earth and the sun.
- Forces that act at a distance (electric, magnetic, and gravitational) can be explained by fields that extend through space and can be mapped by their effect on a test object (a charged object, or a ball, respectively).

Assessment

Performance Tasks-	**Other Evidence**
i. Using scientific knowledge to generate design solutions for two objects colliding. Create reports considering the following: cost, mass, speed, time, materials, components, force, technologies, and Newton's Third law. Reflect on the use of Newton's Laws, value of device, and how technology affects abilities. ii. Investigate the change in motion of an object and provide evidence for balanced and unbalanced forces, mass, measurement, and variables. iii. Report on the cause and effect relationships in magnetic forces due to: magnitude of electric current, distance, orientation, and magnetic strength. Using data, make predictions or judgements of possibility. Form questions and explore. iv. Support scientific claims about gravity with research, describing masses of objects and direction of forces in the system. Analyze sources used in research. v. Determine forces at work given evidence of motion where: models of interaction where two objects do not touch, there are electric and magnetic forces, one object influences another. Evaluate why example was given. Collect data and summarize purpose based on distance, charge, orientation, strength, magnitude, magnetism, or electric current.	Lab Experiments Quizzes MAP Testing NJASK and other state testing

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Unit: Energy

Goals by the end of 8th grade.
MS-PS3-1. Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.
MS-PS3-2. Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.
MS-PS3-3. Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.*
MS-PS3-4. Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.
MS-PS3-5. Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.
*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

Interdisciplinary Connections:
Writing CCSS.ELA-LITERACY.WHST.6-8.1-10
Science and Technical Subjects CCSS.ELA-LITERACY.RST.6-8.1-10
History/Social Studies CCSS.ELA-LITERACY.RH.6-8.1-10

Understandings:
- Energy is affected by mass.
- There are different kinds of energy.

Essential Questions:
- How are different kinds of energy related?
- How can energy work for me?

Students will know (DCIs)…
- Motion energy is properly called kinetic energy; it is proportional to the mass of the moving object and grows with the square of its speed.
- A system of objects may also contain stored (potential) energy, depending on their relative positions.
- Relationship Between Energy and Forces When two objects interact, each one exerts a force on the other that can cause energy to be transferred to or from the object.
- Temperature is a measure of the average kinetic energy of particles of matter. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter present.
- Energy is spontaneously transferred out of hotter regions or objects and into colder ones.
- The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that is likely to limit possible solutions.
- A solution needs to be tested, and then modified on the basis of the test results in order to improve it. There are systematic processes for evaluating solutions with respect to how well they meet criteria and constraints of a problem.
- The amount of energy transfer needed to change the temperature of a matter sample by a given amount depends on the nature of the matter, the size of the sample, and the environment.
- When the motion energy of an object changes, there is inevitably some other change in energy at the same time.

Assessment

Performance Tasks-	**Other Evidence**
i. Use graphs to analyze and display: mass, speed, kinetic energy, increases or decreases in energy, proportional relationship between mass and kinetic energy, and the relationship between kinetic energy and speed. ii. Make sense of and describe a given phenomenon. Describe changes in potential energy. iii. Given a problem, minimize or maximize thermal energy transfer. Design a solution using materials with properties such as thickness, heat conductivity, reflectivity. Consider restraints. Test and evaluate designs. iv. Evaluate and relationships in thermal energy transfer between type of matter, mass of matter, and change in kinetic energy of the particles. Develop an investigation plan that records and displays data using units. Consider variables and controls.	Lab Experiments Quizzes MAP Testing NJASK and other state testing

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Unit: Waves and Their Applications in Technologies for Information Transfer

Goals by the end of 8th grade:
MS-PS4-1. Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.
MS-PS4-2. Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.
MS-PS4-3. Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.

Interdisciplinary Connections:
Writing CCSS.ELA-LITERACY.WHST.6-8.1-10
Science and Technical Subjects CCSS.ELA-LITERACY.RST.6-8.1-10
History/Social Studies CCSS.ELA-LITERACY.RH.6-8.1-10

Understandings:
- Graphs and charts can be used to identify patterns in data.
- Waves can be expressed and represented mathematically.
- Waves have many uses and implications in daily life.

Essential Questions:
- What types of waves are there?
- How do they interact with materials?
- How and why do engineers design with these concepts in mind?
- How do waves improve technology?

Students will know (DCIs)…
- A sound wave needs a medium through which it is transmitted.
- When light shines on an object, it is reflected, absorbed, or transmitted through the object, depending on the object's material and the frequency (color) of the light.
- The path that light travels can be traced as straight lines, except at surfaces between different transparent materials (e.g., air and water, air and glass) where the light path bends.
- A wave model of light is useful for explaining brightness, color, and the frequency-dependent bending of light at a surface between media.
- However, because light can travel through space, it cannot be a matter wave, like sound or water waves.
- Digitized signals (sent as wave pulses) are a more reliable way to encode and transmit information.

Assessment

Performance Tasks-
i. Students identify characteristics of a simple mathematical wave. Show repeating quantities, frequency, amplitude, and wavelength.
ii. Students identify types of waves, matter and light, and their properties. Explore wave interaction with materials. Change position of the source of the wave. Use models to make sense of absorption, reflection, and transmission. Evaluate function and use of different waves and materials the real world (noise barriers, light filters, etc.)
iii. Report using research comparing analog signals to digital ones. Highlight reliability, storage space, transmission over distances, and examples of a technology that has been affected by this change.

Other Evidence
Lab Experiments
Quizzes
MAP Testing
NJASK and other state testing

Learning Activities

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Journal Reflections
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Unit: From Molecules to Organisms: Structures and Processes

Goals by the end of 8th grade:
MS-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.
MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
MS-LS1-4. Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.
MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
MS-LS1-6. Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
MS-LS1-7. Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.
MS-LS1-8. Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

Interdisciplinary Connections:
Writing CCSS.ELA-LITERACY.WHST.6-8.1-10
Science and Technical Subjects CCSS.ELA-LITERACY.RST.6-8.1-10
History/Social Studies CCSS.ELA-LITERACY.RH.6-8.1-10

Understandings:	**Essential Questions:**
■ Life consists of cells and systems. ■ Two main types are plant and animal cells. ■ Cells have systems and are grouped in systems. ■ Genetics and conditions (nature versus nurture) both affect adult organisms and reproduction and it is described with mathematical probability. ■	■ What is the smallest living thing? ■ Why is a cell the smallest living thing? ■ How do cells make up different kinds of organisms? ■ Does every part of a body have a system? ■ How to group processes affect organisms?

Students will know (DCIs)…

- All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular).
- Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell.
- In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions.
- Animals engage in characteristic behaviors that increase the odds of reproduction.
- Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction.
- Genetic factors as well as local conditions affect the growth of the adult plant.
- Plants, algae (including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use.
- The chemical reaction by which plants produce complex food molecules (sugars) requires an energy input (i.e., from sunlight) to occur. In this reaction, carbon dioxide and water combine to form carbon-based organic molecules and release oxygen.
- Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules, to support growth, or to release energy.
- Cellular respiration in plants and animals involve chemical reactions with oxygen that release stored energy. In these processes, complex molecules containing carbon react with oxygen to produce carbon dioxide and other materials.
- Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories.

Assessment

Performance Tasks-	**Other Evidence**
i. Develop evidence to support: All living things are made of cells. Find evidence that supports presence or absence of cells in living and nonliving things, any part of a living thing, and a variety of organisms (uni and multicellular). Summarize importance of investigation. Reflect on the use of tools and the impact of technology on engineering and scientific advancement in this area. ii. Create a model of a cell. Relate the structure to the function of each organelle. Use the model to hypothesize how a cell maintains its internal processes, for which it needs energy, how it maintains the structure of the cell and controls what enters and leaves, and how parts function as parts of a system that determines cellular function. Compare and contrast plant and animal cells. iii. Students make a claim or generalization about how a body system interacts with subsystems composed of groups of cells. Collect evidence to support the assumption from multiple sources. Reflect on the validity and reliability of the sources. Argue for or against claims from self, peers, and teacher created examples in an multiple formats. iv. Students make a claim about an animal or plant to explain if behaviors or specialized plant structures affect success of reproduction. Support with evidence and compare/contrast with other species. v. Students find evidence to support the impact of genetics and conditions on adult organisms. Use multiple and valid sources. Describe outcomes to situations using probability, given a host of factors. vi. Create a report of how photosynthesis affects energy in an organism, population, and ecosystem. vii. Draw a model of how food molecule are rearranged identifying atoms and chemical reactions. Summarize the implications of these processes for various organisms. viii. Synthesize two sources on sensory input or memory storage in organisms. Outline type of input and responses. Hypothesize ways to influence behavior based on input and responses and explain a cause/ effect relationship.	Lab Experiments Quizzes MAP Testing NJASK and other state testing
Learning Activities	

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Teacher Observations

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Unit: Ecosystems: Interactions, Energy, and Dynamics

Goals by the end of 8th grade:
MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystems.
MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.*
*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

Interdisciplinary Connections:
Writing CCSS.ELA-LITERACY.WHST.6-8.1-10
Science and Technical Subjects CCSS.ELA-LITERACY.RST.6-8.1-10
History/Social Studies CCSS.ELA-LITERACY.RH.6-8.1-10

Understandings:
- Organisms can be classified into populations and ecosystems with complex relationships between living and non-living factors.
- Different types of relationship patterns emerge: competitive, predatory, and mutually beneficial.
- Energy moves through systems.

Essential Questions:
- How do non-living factors affect living factors and vice versa?
- How have humans impacted living and non-living environmental factors?
- How does energy and matter affect a system?

Students will know (DCIs)…

- Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors.
- 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.
- Growth of organisms and population increases are limited by access to resources.
- 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.
- 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.
- 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.
- 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.
- 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.
- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.

Assessment

Performance Tasks-	**Other Evidence**
i. Organize charts, data, and graphs indicating examples of environmental factors over time. Analyze and interpret the data. Present conclusions. ii. Students organize information on multiple cases of a type of relationship in an ecosystem: competitive, predatory, and mutually beneficial. Hypothesize conditions where that type of relationship develops using reasoning and evidence. iii. Identify producers, consumers, and/or decomposers in various ecosystems and label flow of energy, living and non-living parts, and transfer of matter (atoms) in the system. Recognize conservation of matter in systems and their interactions. iv. Research an ecosystem that has sustained a significant change (invasive species, natural disaster, etc.) Describe causal and correlational components of changes in the ecosystem. Argue, in oral or written format, validity of predictions in similar cases, real or imaginary. v. Given various design solutions for maintaining biodiversity, compare and contrast best design solutions, factors that impact species, stability, and ecosystem services. Evaluate strengths and weaknesses of these options. Predict side effects.	Lab Experiments Quizzes MAP Testing NJASK and other state testing

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Unit: Heredity: Inheritance and Variation of Traits

Goals by the end of 8th grade:
MS-LS3-1. Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.
MS-LS3-2. Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.

Interdisciplinary Connections:
Writing CCSS.ELA-LITERACY.WHST.6-8.1-10
Science and Technical Subjects CCSS.ELA-LITERACY.RST.6-8.1-10
History/Social Studies CCSS.ELA-LITERACY.RH.6-8.1-10

Understandings:
- Genes and heredity affect organisms and are passed from parents to offspring..
- Mathematical patterns can be found in genetic variation.

Essential Questions:
- What is the difference between asexual reproduction and sexual reproduction?
- What are reasons sexual reproduction is evolutionarily important?

Students will know…
- Genes are located in the chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes. Each distinct gene chiefly controls the production of specific proteins, which in turn affects the traits of the individual. Changes (mutations) to genes can result in changes to proteins, which can affect the structures and functions of the organism and thereby change traits.
- In addition to variations that arise from sexual reproduction, genetic information can be altered because of mutations. Though rare, mutations may result in changes to the structure and function of proteins. Some changes are beneficial, others harmful, and some neutral to the organism.
- Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring.
- Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited.
- In sexually reproducing organisms, each parent contributes half of the genes acquired (at random) by the offspring. Individuals have two of each chromosome and hence two alleles of each gene, one acquired from each parent. These versions may be identical or may differ from each other.

Assessment

Performance Tasks-
i. Develop model of describing genes and mutations. Describe relationship between genes, proteins, function, traits, and generalize if these changes are positive, negative, or neutral for the organism.
ii. Develop a model or diagram that shows differences between heredity in asexual and sexual reproduction. Hypothesize reasons for two types of reproduction and the benefits or disadvantages of each.

Other Evidence
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Quizzes
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NJASK and other state testing

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Unit: Biological Evolution: Unity and Diversity

Goals by the end of 8th grade:
MS-LS4-1. Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.
MS-LS4-2. Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.
MS-LS4-3. Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.
MS-LS4-4. Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.
MS-LS4-5. Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.
MS-LS4-6. Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.

Interdisciplinary Connections:
Writing CCSS.ELA-LITERACY.WHST.6-8.1-10
Science and Technical Subjects CCSS.ELA-LITERACY.RST.6-8.1-10
History/Social Studies CCSS.ELA-LITERACY.RH.6-8.1-10

Understandings:	**Essential Questions:**
■ Fossils provide evidence of the development of Earth's organisms over time. ■ Common ancestors can account for anatomical similarities between organisms. ■ Anatomical similarities may infer stronger evolutionary connections.	■ Do the natural laws the governed Earth long ago still work today? ■ Is evolution a fact? ■ What do embryos tell us about evolution? ■ How does competition affect evolution?

Students will know…

- The collection of fossils and their placement in chronological order (e.g., through the location of the sedimentary layers in which they are found or through radioactive dating) is known as the fossil record. It documents the existence, diversity, extinction, and change of many life forms throughout the history of life on Earth.
- Anatomical similarities and differences between various organisms living today and between them and organisms in the fossil record, enable the reconstruction of evolutionary history and the inference of lines of evolutionary descent.
- Comparison of the embryological development of different species also reveals similarities that show relationships not evident in the fully formed anatomy.
- Natural selection leads to the predominance of certain traits in a population, and the suppression of others.
- In artificial selection, humans have the capacity to influence certain characteristics of organisms by selective breeding. One can choose desired parental traits determined by genes, which are then passed on to offspring.
- Adaptation by natural selection acting over generations is one important process by which species change over time in response to changes in environmental conditions. Traits that support successful survival and reproduction in the new environment become more common; those that do not become less common. Thus, the distribution of traits in a population changes.

Assessment

Performance Tasks-	**Other Evidence**
i. Organize charts, tables, images, and graphs of the fossil record to interpret the similarities and differences. Find relationships between time, layers, organisms, and patterns of change in anatomical structure in the fossil record. Find events such as mass extinctions, evolution, details about one type of organism, and long term increase in diversity of organisms on Earth. ii. Use example of an organism from a fossil and from a skeleton today to generalize about evolutionary processes. Compare and contrast evolutionary similarities between different creatures' body structures, such as wings on birds, insects, and bats. Summarize importance of evolutionary concepts in these cases. iii. Interpret displays of embryonic development of different creatures and animal kingdoms. Identify linear and non-linear relationships. iv. Develop a case or scenario that demonstrates an understanding of the relationship between genetic variation and natural selection in a population. v. Summarize a case or scenario where humans have used technology to influence the genetic make-up of a plant or animal to produce a desired trait (gene modification, selective breeding, gene therapy, etc). Analyze the bias and reliability of each source. vi. Explain a given phenomenon: change in species over time where traits that lead to adaptation to environment increase over time, natural selection, and conditions that lead to extinction. Create graphs or charts that show population change over time, distribution of traits, environmental conditions, trends, cause and effect relationships, and the impact of multiple factors.	Lab Experiments Quizzes MAP Testing NJASK and other state testing
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Unit: Earth's Place in the Universe

Goals by the end of 8th grade:
MS-ESS1-1. Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.
MS-ESS1-2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.
MS-ESS1-3. Analyze and interpret data to determine scale properties of objects in the solar system.
MS-ESS1-4. Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.

Interdisciplinary Connections:
Writing CCSS.ELA-LITERACY.WHST.6-8.1-10
Science and Technical Subjects CCSS.ELA-LITERACY.RST.6-8.1-10
History/Social Studies CCSS.ELA-LITERACY.RH.6-8.1-10

Understandings:
- Bodies in space behave in a way that reveals information about gravity, mass, and space.
- Motions of bodies in space are related force and mass.
- Earth has a 4.6 billion year history that has been organized based on geologic events.

Essential Questions:
- Why are the objects in the solar system round?
- Why do objects move on circle-like paths?
- What kind of objects are in space?
- How can we measure and organize time for Earth’s history?

Students will know (DCIs)…

- Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models.
- This model of the solar system can explain eclipses of the sun and the moon. Earth's spin axis is fixed in direction over the short-term but tilted relative to its orbit around the sun.
- The seasons are a result of that tilt and are caused by the differential intensity of sunlight on different areas of Earth across the year.
- Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe.
- The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them. The solar system appears to have formed from a disk of dust and gas, drawn together by gravity
- The geologic time scale interpreted from rock strata provides a way to organize Earth's history. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale

Assessment

Performance Tasks-

i. Create a model that includes the Earth, Sun, Moon, solar energy, accuracy relating to scale, and demonstrates relationships between these objects relating to moon phases, eclipses, seasons,

ii. Recognize important components of a system: understanding of gravity, the solar system, the Milky Way galaxy, shapes and motions of galaxies, and the larger universe. Summarize the connections between these and predict what differences would arise with different circumstances: less gravity more gravity, no gravity, changing distances from objects, etc.

iii. Students organize given data on solar system objects from various Earth- and space-based instruments to allow for analysis and interpretation. Describe similarities and differences. Investigate improvement of technology and measurement of space.

iv. Research and present events in Earth's history that demonstrate large change (fossil records, volcanic eruptions, asteroid impacts, etc). Make predictions and generalizations about Earth's future.

Other Evidence

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Unit: Earth's Systems

Goals by the end of 8th grade:
MS-ESS2-1. Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.
MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
MS-ESS2-3. Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.
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.
MS-ESS2-5. Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.
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.

Interdisciplinary Connections:
Writing CCSS.ELA-LITERACY.WHST.6-8.1-10
Science and Technical Subjects CCSS.ELA-LITERACY.RST.6-8.1-10
History/Social Studies CCSS.ELA-LITERACY.RH.6-8.1-10

Understandings:	**Essential Questions:**
■ Gradual and catastrophic events, slow and fast, change the Earth's surface. ■ Energy flows in Earth's systems. ■ Many variables influence the Earth's surface.	■ What processes change the Earth's surface?

Students will know…

- 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.
- 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.
- The Roles of Water in Earth's Surface Processes Water's movements—both on the land and underground—cause weathering and erosion, which change the land's surface features and create underground formations.
- Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches.
- Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart.
- Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land.
- Global movements of water and its changes in form are propelled by sunlight and gravity.
- Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents.
- 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.
- 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.

Assessment

Performance Tasks-	**Other Evidence**
i. Identify Earth's components, locations, processes, energy (from interior or exterior), temporal and spatial scales, and describe change that is constantly occurring on larger time scales than human lifetimes. (weathering and erosion, rock cycle, etc.) ii. Students create a claim about how geoscience processes have changed the Earth's surface over time, either a catastrophic or gradual event. Use multiple and reliable sources. iii. Organize and interpret data on different continents, seafloor structures, and ocean crusts. Provide evidence for plate movement (distribution of structures, separations, shapes of continents, sharing fossils in different regions, etc.) iv. Students use components water, gravity, sunlight, atmosphere, landforms, and living things to describe systems and relationships between these components that shape the Earth's surface. v. Students analyze example of a system on Earth to deduce a main idea. Attach evidence theories that are appropriate to the example. Summarize in probabilistic terms, since large systems include many variables. vi. Identify other variables affecting Earth: rotation, atmosphere, ocean and thermal energy transfer, energy, and distribution of land, ice, or living things. Make connections between these variable and summarize their impact on Earth's surface and systems. Pinpoint one regional climate as an example of these aspects.	Lab Experiments Quizzes MAP Testing NJASK and other state testing
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Unit: Earth and Human Activity

Goals by the end of 8th grade:
MS-ESS3-1. Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.
MS-ESS3-2. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.*
MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per capita consumption of natural resources impact Earth's systems.
MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.
*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

Interdisciplinary Connections:
Writing CCSS.ELA-LITERACY.WHST.6-8.1-10
Science and Technical Subjects CCSS.ELA-LITERACY.RST.6-8.1-10
History/Social Studies CCSS.ELA-LITERACY.RH.6-8.1-10

Understandings:	**Essential Questions:**
■ Humans impact the Earth is many ways. ■ The Earth impacts humans in many ways.	■ What effects do humans leave on Earth?

Students will know (DCIs)…

- Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources. Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes.
- Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events.
- Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things.
- Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise.
- Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities.

Assessment

Performance Tasks-

i. Report on the uneven distribution of Earth's resources, geological causes of this, and human management of extraction of this resource. Predict consequences of harvesting this resource, positive and negative. Use a variety of reliable sources.

ii. Organize and interpret data on a natural hazard event including the location, magnitude, frequency, and any associated precursor event or geologic forces. Research current solutions for these disasters that have been engineered. Predict future occurrence of the event and other ways to mitigate damage.

iii. Given a problem relating to human impact on the environment, develop a solution to negative results that includes technology, society's needs and desires, determine causal and correlational relationships, various constraints, and predicts the success of such a plan.

iv. Present an argument that population increases effects Earth and its systems. Provide multiple sources of evidence and evaluate sources on bias, reliability, and interpretation of data. Provide conclusions based on evidence.

v. Summarize ways humans have impacted the Earth in the past century, either positively or negatively. Explain changes that happened quickly or slowly over time. Provide evidence for claims.

Other Evidence

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Unit: Engineering Design

Goals by the end of 8th grade:
MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Interdisciplinary Connections:
Writing CCSS.ELA-LITERACY.WHST.6-8.1-10
Science and Technical Subjects CCSS.ELA-LITERACY.RST.6-8.1-10
History/Social Studies CCSS.ELA-LITERACY.RH.6-8.1-10

Understandings:
- Engineering concepts and processes can be used to find solutions.
- A problem can be defined and solutions can be evaluated based on scientific evidence and the scientific process.

Essential Questions:
- How do engineers find solutions?
- What factors influence design?

Students will know (DCIs)…

- The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions.
- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.
- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors.
- 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 those characteristics may be incorporated into the new design.
- A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. Models of all kinds are important for testing solutions.
- 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.

Assessment

Performance Tasks-

i. Define a problem that can be solved by the development of an object, tool, process, or system. Define its boundaries, constraints, impacts on society and environment.
ii. Students provide evidence for solutions. Collaborative to find solutions. Use the scientific method to evaluate ideas. Compare and contrast solutions.
iii. Student organize data, identify relationships, and interpret data.
iv. Students use a self generated model to generate data representing the functioning of the given proposed solution and each of its iterations as components of the model are modified. Modify and summarize reasoning for improvements through itinerate testing.

Other Evidence

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Resources

http://www.nextgenscience.org/sites/ngss/files/Middle%20School%20%2B%20Exec%20Summary%20June%202015_0.pdf

http://www.nextgenscience.org/sites/ngss/files/Appendix%20K_Revised%208.30.13.pdf

http://www.njea.org/news-and-publications/njea-review/march-2014/next-generation-science-classroom

http://www.nextgenscience.org/three-dimensions

http://www.nextgenscience.org/classroom-sample-assessment-tasks

http://www.nsta.org/about/positions/ngss.aspx

http://static.pdesas.org/content/documents/M1-Slide_19_DOK_Wheel_Slide.pdf

http://www.nextgenscience.org/sites/ngss/files/NGSS%20DCI%20Combined%2011.6.13.pdf
Summative and Formative assessment Statements
http://www.nextgenscience.org/sites/ngss/files/Middle%20School%20%2B%20Exec%20Summary%20June%202015_0.pdf

http://www.cascience.org/csta/ngss_mythsandfacts.asp

http://www.grantwiggins.org/documents/UbDQuikvue1005.pdf

http://www.nj.gov/education/modelcurriculum/sci/8.shtml

Accommodations and Modifications for Special Education Students

1. Break assignments into segments of shorter tasks
2. Use concrete examples of concepts before teaching the abstract
3. Relate information to the student's experiential base
4. Reduce the number of concepts presented at one time
5. Provide an overview of the lesson before beginning
6. Schedule frequent, short conferences with the student to heck for comprehension
7. Provide consistent review of any lesson before introducing new information
8. Highlight important concepts to be learned in text of material
9. Give additional presentations by varying the methods using repetition, simpler explanation, more examples and modeling
10. Require verbal responses to indicate comprehension
11. Allow for oral administration of tests if needed
12. Five written directions to supplement verbal directions
13. Slow the rate of presentation
14. Paraphrase information
15. Keep statements short and to the point
16. Encourage feedback from students to check for understanding
17. Familiarize student with any new vocabulary before beginning of the lesson
18. Alert student's attention before expressing key points
19. Utilize visual aids such as charts and graphs
20. Make frequent checks for assignments progress/completions
21. Make sure the appropriate books and materials are open to the correct pages
22. Check on progress often in the first few minutes of work
23. Provide time suggestions for each task

Accommodations and Modifications for Gifted Students

1. Encourage students to explore concepts in depth and encourage independent studies or investigations.
2. Use thematic instruction to connect learning across the curriculum.
3. Encourage creative expression and thinking by allowing students to choose how to approach a problem or assignment.
4. Expand students' time for free reading.
5. Invite students to explore different points of view on a topic of study and compare the two.
6. Provide learning centers where students are in charge of their learning.
7. Brainstorm with gifted children on what types of projects they would like to explore to extend what they're learning in the classroom.
8. Determine where students' interests lie and capitalize on their inquisitiveness.
9. Refrain from having them complete more work in the same manner.
10. Employ differentiated curriculum to keep interest high.
11. Avoid drill and practice activities.
12. Ask students' higher level questions that require students to look into causes, experiences, and facts to draw a conclusion or make connections to other areas of learning.
13. If possible, compact curriculum to allow gifted students to move more quickly through the material.
14. Encourage students to make transformations-use a common task or item in a different way.

Accommodations For English Language Learners

1. Read aloud of test directions in student's native language
2. Picture Dictionary (alone, combined with oral reading of test items in English, and combined with bilingual glossary)
3. Customized Dictionary/glossary in English (content-related terms removed)
4. Traditional glossary with Spanish translations (content-related terms removed)
5. Bilingual Dictionary
6. Spanish Translation of Test
7. Dual Language Translation of Test
8. Test administration directions that are simplified or clarified
9. Test questions read aloud to student by teacher or electronic media-ELA
10. Colored overlay, mask, or other means to maintain visual attention
11. Essay responses dictated to a scribe, audio recorder, or speech-to-text converter and the student provides all spelling and language conventions

Accommodations For Students At Risk

1. Adjust time for completion of assignments
2. Allow frequent breaks, vary activities often
3. Modify assignments requiring copying in a timed situation
4. Modify homework (Specify.)
5. Give directions in small units
6. Use written backup for oral directions
7. Lower reading level of assignment (RL=__)
8. Adjust length of assignment
9. Change format of assignment
10. Break assignment into a series of smaller assignments
11. Reduce paper and pencil tasks
12. Read directions/worksheets to student
13. Record or type assignments
14. Maintain assignment notebook
15. Avoid penalizing for spelling errors
16. Block off or mask sections of work
17. Use highlighted texts
18. Emphasize teaching auditory ___ visual ___ tactile ___ multi
19. Individual/small group instruction
20. Utilize specialized curriculum
21. Tape lectures for replay
22. Present demonstration
23. Utilize manipulative
24. Emphasize critical information/key concepts
25. Pre-teach vocabulary
26. Provide visual cues
27. Provide study guide or note cards or notes