Orange Public Schools

Office of Curriculum & Instruction

2019-2020 Science Curriculum Guide

Grade 7

Module 1A: Structure and Properties of Matter

September 9, 2019 – October 4, 2019

Board Approved: 1.14.2020

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Grade 7 – Unit 1A - Physical Science (PS) Structure and Properties of Matter

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GRADE 7 Yearlong Scope and Sequence by Instructional Weeks

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13

UNIT 1 – Physical Science (Sept 9th – Dec 20th)

TOPIC 1 STRUCTURE AND PROPERTIES OF MATTER

(4 Weeks)
Students build understandings of what occurs at the atomic and molecular scale. Students apply their understanding that pure substances have characteristic properties and are made from a single type of atom or molecule.

TOPIC 2 INTERACTIONS OF MATTER (4 Weeks)
Students are also able to apply an understanding of optimization design and process in engineering to chemical students provide molecular-level accounts of states of
matter and changes between states, of how chemical reactions involve regrouping of atoms to form new substances, and of how atoms rearrange during chemical reactions.

TOPIC 3 CHEMICAL REACTIONS (5 Weeks)
Students provide molecular-level accounts of states of matters and changes between states, of how chemical reactions involve regrouping of atoms to form new substances, and of how atoms rearrange during chemical reactions. Students also apply their understanding of optimization design and process in engineering to chemical reaction systems.

Week 14	Week 15	Week 16	Week 17	Week 18	Week 19	Week 20	Week 21	Week 22

UNIT 2 – Earth Science (Jan 2nd – Feb 14th) (6 weeks)

Students examine geoscience data in order to understand processes and events in Earth's history. Important crosscutting concepts in this unit are scale, proportion, and quantity, stability and change, and patterns in relation to the different ways geologic processes operate over geologic time.

Unit 3 – Life Science (Feb 24th – Jun 12th)

TOPIC 1 Structure and Function (3 Weeks)
Students demonstrate age appropriate abilities to plan and carry out investigations to develop evidence that living organisms are made of cells. Students gather information to support explanations of the relationship between structure and function in cells.

Week 23	Week 24	Week 25	Week 28	Week 29	Week 30	Week 31	Week 32	Week 33	Week 34

Unit 3 – Life Science (Feb 24th – May 29th)

TOPIC 2 Body Systems (3 Weeks)
Students develop a basic understanding of the role of cells in the body systems and how those systems work to support the life functions of the organism. Students will construct explanations for the interactions of systems in cells and organisms.

TOPIC 3 Inheritance and Variation of Traits (4 Weeks)
Students develop and use models to describe how gene mutations and sexual reproduction contribute to genetic variation. Students understand how genetic factors determine the growth of an individual organism.

TOPIC 4 Organization for Matter and Energy Flow in Organisms (3 Weeks)
Students provide a mechanistic account for how cells provide a structure for the plant process of photosynthesis in the movement of matter and energy needed for the cell. Students use conceptual and physical models to explain the transfer of energy and the cycling of matter as they construct explanations for the role of photosynthesis in cycling matter in ecosystems.

Week 35	Week 36	Week 37

UNIT 4 Engineering Design (June 1th – 19th)

TOPIC 1 ENGINEERING & DESIGN PROCESS (3 Weeks)

Grade 7 – Unit 1A - Physical Science (PS) Structure and Properties of Matter

Grade/Course Overview:

This is a hands-on course in which science concepts are taught to 7th grade students in a 3-dimensional manner guided by the NJSLS. We will focus on studying concepts related to physical science, specifically Matter and Its Interactions. The purpose of this course is to have students develop, model, and carry out investigations related to these topics by using strategies aligned with the New Jersey Student Learning Standards and the Next Generation Science Standards (MS-PS1-1, MS-PS1-2, MS-PS1-3, MS-PS1-4, MS-PS1-5,and MS-PS1-6).

Students will focus on the following

- structure and properties of matter
- interactions of matter
- chemical reactions

Unit 1: Structure and Properties of Matter

Unit Summary:

Students build understandings of what occurs at the atomic and molecular scale. Students apply their understanding that pure substances have characteristic properties and are made from a single type of atom or molecule. They also provide a molecular level accounts to explain states of matter and changes between states.

Students:

- perform short, simple investigations that evaluate their existing knowledge of one or more concepts related to matter and its interactions.
- make observations of pure substances and mixtures and determine if new substances are formed.
- evaluate predictions, use evidence to support claims, and infer cause-and-effect relationships.
- observe and describe samples of matter based on their physical and chemical properties (including solubility, and reactivity).
- identify mystery samples on the basis of their physical and chemical properties.
- compare the densities of different substances, including liquids and irregularly shaped objects.
- make and test predictions about the floating of solids in liquids and use their findings to re-create the density bottle they explored in the Pre-Assessment.
- record the temperature of water as it melts, warms, and boils and then make connections with molecular-level observations in a computer simulationof the same experiment.
- apply their understanding of the law of conservation of mass to plan and carry out investigations of the mass of water as it melts or freezes in a sealed container.
- rotate through stations to collect information about 16 different element samples.
- combine elements and create models of simple molecules using plastic atoms and computer simulations.
- observe and describe samples of pure substances and mixtures.
- apply engineering skills to design a method for removing impurities from rock salt.
- analyze and interpret data on the properties of substances before and after different chemical reactions.
- use their data to support the claim that a new substance has been formed.
- apply their understanding of the law of conservation of matter to create models that explain situations in which matter seems to appear or disappear.

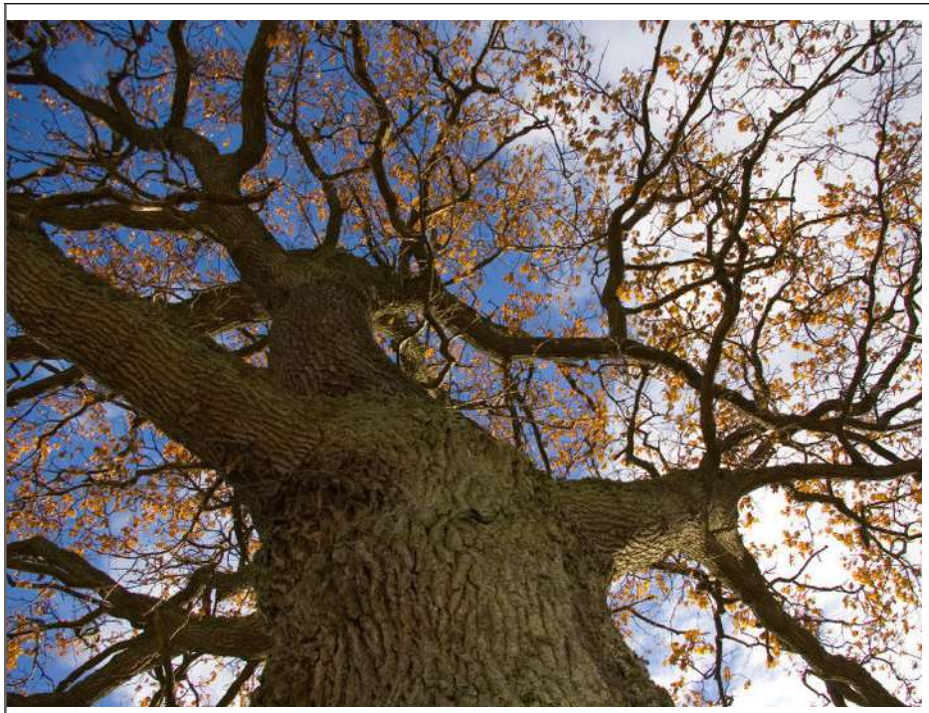
Grade 7 – Unit 1A - Physical Science (PS) Structure and Properties of Matter

Students use *cause and effect*, *scale, proportion and quantity*, *structure and function*, *interdependence of science, engineering, and technology*, and *the influence of science, engineering and technology on society and the natural world* to provide a framework for understanding the disciplinary core ideas. Students demonstrate grade appropriate proficiency in *developing and using models*, and *obtaining, evaluating, and communicating information*. Students are also expected to use the scientific and engineering practices to demonstrate understanding of the core ideas.

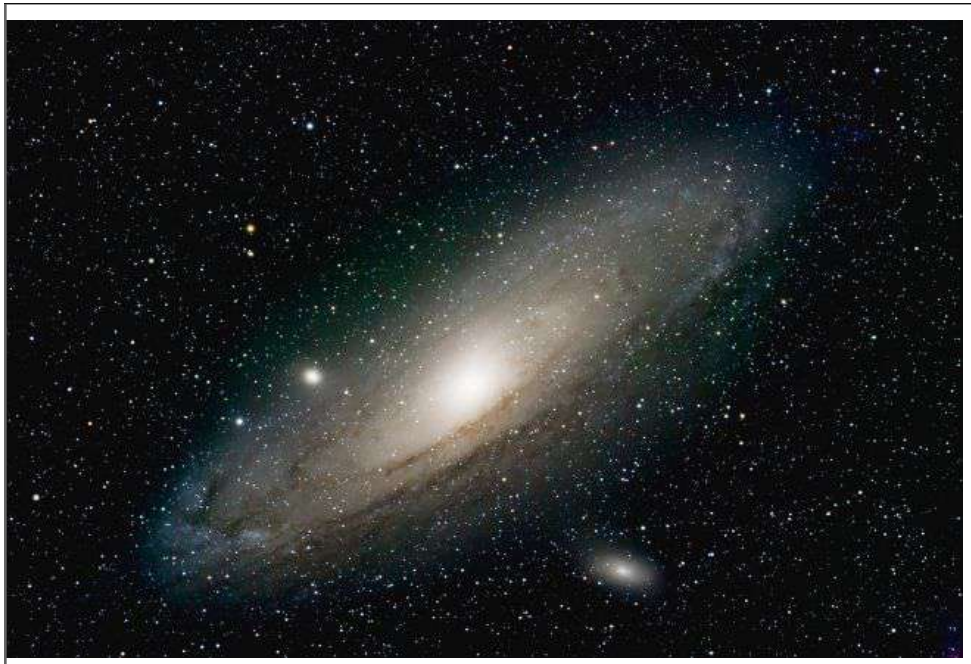
This unit is based on MS-PS1-1 and MS-PS1-2.

Related Phenomena:

https://www.ngssphenomena.com/new-gallery-1/bafut4jsx38kkie0ocdhf90gtoszep



https://www.ngssphenomena.com/new-gallery-1/1m1mn1c2wjz7ivxrqabnjgiz9ggdyv



https://www.ngssphenomena.com/new-gallery-1/55dvsqc5vzssd6a5zclpckma0i9cma

Additional Phenomena Resources

#Project Phenomena

https://sites.google.com/site/sciencephenomena/

Phenomena for NGSS

https://www.ngssphenomena.com/how-to-use-phenomena

The Wonder of Science – Phenomena

https://thewonderofscience.com/phenomenal

Sunrise Science (a collection of fee websites)

http://sunrisescience.blog/free-websites-ngss-anchoring-phenomena/

Teaching Channel – Phenomena

https://www.teachingchannel.org/video/using-phenomena-achieve

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STEM Scopes – Developing Student Inquiry Through Phenomena

https://www.stemscopes.com/phenomena

Essential Questions:	**Enduring Understandings:**
• How can one explain the structure, properties, and interactions of matter? • How do particles combine to form the variety of matter one observes? • How do molecules move within a solid, a liquid, and a gas? • What happens to the average energy of the molecules in a substance when the substance is heated? • How do changes of state occur? • What affects the change in state of matter? • How do the particles in matter change when a substance becomes hotter, cools down, or changes state? • What are molecules, and how are the properties of molecules different than the atoms that they come from? • How can you predict when atoms will combine to form a molecule? • What are the characteristics of ionic compounds? • How are elements, compounds, and molecules all related to one another? • How do mixtures, solutions, and pure substances differ? • How are solutions, suspensions, and colloids similar and different?	• 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. • 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. • Reactivity is a chemical property of matter. • Unknown substances can be identified based on their characteristic • physical and chemical properties.

Grade 7 – Unit 1A - Physical Science (PS) Structure and Properties of Matter

• How do the substances of mixtures affect the process of separation? • How does matter form different types of mixtures? • How do substances combine or change (react) to make new substances? • How does one characterize and explain these reactions and make predictions about them? • How do scientists represent chemical reactions? • How is it determined that a chemical reaction has occurred? • How are chemical equations written to show that mass is conserved? • What happens during a chemical reaction, how do you know when a chemical reaction has occurred, and how can you represent chemical reactions with equations? • How do chemicals benefit society? • How are the risks of using chemicals evaluated? • How do natural and synthetic chemicals compare to each other? • How are chemicals both helpful and harmful to us and to our world?	• Density is a physical property that can be used to distinguish substances. • Graduated cylinders and electronic balances are tools used to measure the volume and mass of liquids. • Different substances possess different densities. • The volume of an irregular object can be determined indirectly. • Floating and sinking are observable evidence of the relative densities of different materials. • The approximate density of a liquid can be determined by observing the behavior of objects of known densities in the liquid. • Water reaches its boiling point at 100℃. It takes a significant amount of energy to get temperature to rise. • Thermal energy is the motion of atoms and molecules in a • substance. • Changes of state that occur with variations of temperature can be described and predicted. • Matter and mass are conserved in physical processes. • An increase in the temperature of a substance increases the kinetic energy of the particles. • Changes of state that occur with variations of temperature can be described and predicted. • 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. • Matter exists as pure substances (elements and compounds) and as mixtures.

	● The behavior of bulk substances depends on their structures at the ● atomic and molecular levels. ● Substances can be classified as either pure substances or as mixtures. ● Different mixtures composed of the same types of pure substances can vary in composition. ● Distillation is the process of separating component substances from a liquid through evaporation and condensation. ● Combining methods to separate mixtures can lead to more complete isolation of a mixture's components. ● When a chemical reaction occurs, the atoms that make up the original substance are regrouped into different molecules. ● Energy can be used to break the chemical bonds between atoms in a molecule. ● The properties of compounds differ from those of the elements that make them up. ● A precipitate is a solid formed in a solution as a product of a chemical reaction. ● The formation of a precipitate is evidence of a chemical reaction. ● When a chemical reaction occurs, the properties of the products differ from the properties of the reactants. ● When a chemical reaction occurs, the atomic-level structure of substances changes. ● When a physical change occurs, the atomic-level structure of substances does not change. ● An understanding of chemical reactions can shed light on the processes of real-life events. ● Mass remains constant during physical or chemical changes.

	● The mass of reactants in a chemical reaction is identical to the mass of the products. ● A closed system is needed to demonstrate the conservation of mass. ● The apparent gain in mass during a chemical reaction can be explained by the addition of invisible reactants to form new products. ● Mass can neither be created nor destroyed during physical and chemical changes. The making of molecular models that represent events during chemical reactions supports the law of conservation of mass.

Possible Student Misconceptions:

- Students may believe that molecules in solids do not move; actually, molecules in solids are vibrating continuously.
- Students may think that gases do not have mass. Gases have mass because the individual atoms that make up a gas each have an atomic mass.
- Students often think that a chemical bond physically links atoms, as a nail holds pieces of wood together. Explain that bonding is the result of attractive forces.
- Some students might think that molecules are always made of two or more atoms of different elements. In fact, many molecules are made of two or more atoms of the same element. Therefore, molecules can either be elements (H_2, O_2, N_2) or compounds (HCl, H_2O, CO_2).
- Some students might think that all compounds are made of molecules. In fact, ionic compounds are made of alternating positive and negative ions. The ionic compound, or salt, sodium chloride is not made of molecules of NaCl. It is made of ions of Na^+ and Cl^-.

- Many students do not believe that a compound is a pure substance because it is composed of more than one element. A compound is a pure substance because all of the molecules in a compound are identical.
- Some students think that solids cannot be mixtures. Many manufactured metals are a mixture of metals. Rocks are also examples of mixtures of solids.
- Some students do not think that air is a mixture. Air is a mixture of different compounds. Fog and smoke are colloids that exist in the air.
- Some students may believe that solutions and colloids are pure substances because they cannot see the separate individual particles in the solution or colloid. Solutions and colloids are both mixtures with very small or dissolved particles.
- Chemical reactions are always violent or explosive. In fact, such chemical reactions as the rusting of iron or the tarnishing of silver occur slowly.
- Atoms and molecules only mix when a chemical reaction occurs and the original substances are still present. In fact, while the original atoms are still present, they have been rearranged to form new substances with new properties.
- Changes in state and dissolving are chemical reactions. In fact, changes in state and dissolving are physical changes because the substances involved retain their original properties.
- Mass decreases during a chemical reaction. While this may appear to be so in some reactions, it is only because some of the mass have escaped undetected, as when an invisible gas is produced. The total mass of the products always equals the total mass of the reactants.
- Students may think that all chemicals are liquids. In fact, chemicals can exist as solids, liquids, or gases.
- Students may have partial or incomplete information about chemicals, believing that they are all good or all bad. In fact, chemicals have mixed risks and benefits and each must be considered individually when making healthy choices.
- Students may believe that natural substances are always healthier than artificial substances. In fact, chemicals may be made through chemical reactions or by extraction from natural sources. Many “natural flavors” in foods are chemically identical to “artificial flavors,” so avoiding both of these is a healthier choice.

Grade 7 – Unit 1A - Physical Science (PS) Structure and Properties of Matter

NGSS Performance Expectations: ***Students who demonstrate understanding can…***

MS-PS1-1: Develop models to describe the atomic composition of simple molecules and extended structures. **Assessment does not include valence electrons and bonding energy, discussing the ionic nature of subunits of complex structures, or a complete description of all individual atoms in a complex molecule or extended structure is not required.*]

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. **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. *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.

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. * 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. *Assessment is limited to the criteria of amount, time, and temperature of substance in testing the device.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data: Analyze and interpret data to determine similarities and differences in findings. Planning and Carrying Out Investigations: Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. Developing and Using Models: Develop a model to predict and/or describe phenomena. Scientific Knowledge is Based on Empirical Evidence: Science knowledge is based upon logical and conceptual connections between evidence and explanations.	PS1.A Structure and Properties of Matter: Gases and liquids are made of molecules or inert atoms that are moving about relative to each other. PS1.A Structure and Properties of Matter: 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. PS1.A Structure and Properties of Matter: The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter. 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	Scale, Proportion, and Quantity: Proportional relationships (e.g. speed as the ratio of distance traveled to time taken) among different types of quantities provide information about the magnitude of properties and processes. Cause and Effect: Cause and effect relationships may be used to predict phenomena in natural or designed systems. Patterns: Macroscopic patterns are related to the nature of microscopic and atomic-level structure. Structure and Function: The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.

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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. Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena: Laws are regularities or mathematical descriptions of natural phenomena. Asking Questions and Defining Problems: Ask questions that can be investigated within the scope of the classroom, outdoor environment, and museums and other public facilities with available resources and, when appropriate, frame a hypothesis based on observations and scientific principles. 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 support or not supported by evidence. Engaging in Argument From Evidence: Construct and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or model for a phenomenon or a solution to a problem.	refers to the energy transferred due to the temperature difference between two objects. PS3.A Definitions of Energy: Temperatureis 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. PS3.A Definitions of Energy: 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. PS3.A Definitions of Energy: 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. PS3.B Conservation of Energy and Energy Transfer: 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. PS1.A Structure and Properties of Matter: Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it. 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	Energy and Matter: The transfer of energy can be tracked as energy flows through a designed or natural system. 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.

	molecules, and these new substances have different properties from those of the reactants. PS1.A Structure and Properties of Matter: Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it. 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. ETS1.B A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. ETS1.B Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. PS1.A Structure and Properties of Matter: Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it. PS1.B Chemical Reactions: Some chemical reactions release energy, others store energy. ETS1.B.1 A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. 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. ETS1.C 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.	

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	PS1.A: Structure and Properties of Matter: Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals). 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 PS1.B Chemical Reactions: The total number of each type of atom is conserved, and thus the mass does not change. 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. ETS1.C 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. ETS1.C 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.	

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Primary CCSS ELA/Literacy Connections:	Primary CCSS Mathematics Connections:
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)**	**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)**

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Unit Performance Task:

NGSS Assessment Portal

https://ngss-assessment.portal.concord.org/ngsa-collections

Readorium: (Classwork/Quiz Grade, Extension/Lesson Closer, Homework):

Vocabulary Spelling City: (classwork/Quiz Grade)

Spellingcity.com

Edulastic (online formative and summative 3D Assessments)

App.edulastic.com

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Lesson Scope and Sequence			
Unit Pacing and Duration	**Focus Standards with CCSS Connections**	**Primary Resources & Supplements** *Each link requires a teacher login for full access to assessments. All assessments can be found through each homepage by searching the key headings if login links are inaccessible.	**Assessment** *Each link requires a teacher login for full access to assessments. All assessments can be found through each homepage by searching the key headings if login links are inaccessible.
270 Minutes (6 - 45 minute class periods)	NGSS: • MS-PS1-1 • MS-PS1-2 • MS-PS1-3 • MS-PS1-4 • MS-PS1-5 • MS-PS1-6 • MS-PS3-4 CCSS for ELA: • RI.6.1 Key idea and details • RI.6.4 Craft and structure • RST.6-8.3 Key idea and details • SL.6.1 Comprehension and collaboration • WHST.6-8.1.b Research to build and present knowledge CCSS for Math: • 6.EE.C.9 Represent and analyze quantitative relationships between dependent and independent variables. • 8.EE.B.5 Understand the connections among proportional relationships, lines, and linear equations	Primary Resources: STC - Lesson 1: Pre-Assessment-Matter and Its Interactions https://carolinascienceonline.com/#/teacher/product-lines/STC/products/580651d37d7f8024e43ba5b2?play Supplements: Phenomenal GRC Lessons (Gather, Reason, Communicate Investigations) https://sites.google.com/3d-grcscience.org/going3d/home Gizmos Online Investigations Explorelearning.com	NGSS Assessment Portal https://ngss-assessment.portal.concord.org/ngsa-collections Readorium: (Classwork/Quiz Grade, Extension/Lesson Closer, Homework): Vocabulary Spelling City: (classwork/Quiz Grade) Spellingcity.com Edulastic (online formative and summative 3D Assessments) App.edulastic.com
360 Minutes (8 - 45 minute class periods)	NGSS: • MS-PS1-1 • MS-PS1-2 CCSS for ELA: • RST.6-8.3 Key ideas and details • SL.6.1 Comprehension and collaboration • WHST.6-8.1b Research to build and present	Primary Resources: STC - Lesson 2: The Nature of Matter https://carolinascienceonline.com/#/teacher/product-lines/STC/products/580651d37d7f8024e43ba5b2?play Supplements:	NGSS Assessment Portal https://ngss-assessment.portal.concord.org/ngsa-collections Readorium: (Classwork/Quiz Grade, Extension/Lesson Closer, Homework): Vocabulary Spelling City: (classwork/Quiz Grade)

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	knowledge CCSS for Math: • MP5 Use appropriate tools strategically.	Phenomenal GRC Lessons (Gather, Reason, Communicate Investigations) https://sites.google.com/3d-grcscience.org/going3d/home Gizmos Online Investigations Explorelearning.com	Spellingcity.com Edulastic (online formative and summative 3D Assessments) App.edulastic.com
360 Minutes (8 - 45 minute class periods)	NGSS: • MS-PS1-2 CCSS for ELA: • RST.6-8.3 Key ideas and details • RST.6-8.10 Range of reading and level of text complexity • SL.6.1 Comprehension and collaboration • WHST.6-8.2 Text types and purposes CCSS for Math: • MP5 Use mathematical tools appropriately. • 6.EE.A.2.C Apply and extend previous understandings of arithmetic to algebraic expressions.	Primary Resources: STC - Lesson 3: Density Makes A Difference https://carolinascienceonline.com/#/teacher/product-lines/STC/products/580651d37d7f8024e43ba5b2?play Supplements: Phenomenal GRC Lessons (Gather, Reason, Communicate Investigations) https://sites.google.com/3d-grcscience.org/going3d/home Gizmos Online Investigations Explorelearning.com	NGSS Assessment Portal https://ngss-assessment.portal.concord.org/ngsa-collections Readorium: (Classwork/Quiz Grade, Extension/Lesson Closer, Homework): Vocabulary Spelling City: (classwork/Quiz Grade) Spellingcity.com Edulastic (online formative and summative 3D Assessments) App.edulastic.com
225 Minutes (5 - 45 minute class periods)	NGSS: • MS-PS1-1 • MS-PS1-2 • MS-PS1-3 • MS-PS1-4 • MS-PS1-5 • MS-PS1-6 • MS-PS3-4	Primary Resources: STC - Lesson 11: Assessment: Matter and Its Interactions	NGSS Assessment Portal https://ngss-assessment.portal.concord.org/ngsa-collections Readorium: (Classwork/Quiz Grade, Extension/Lesson Closer, Homework):

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	• MS-ETS1-1 • MS-ETS1-2 • MS-ETS1-3 • MS-ETS1-4 CCSS for ELA: • RI.6.1 Key idea and details • RI.6-8.4 Craft and structure • SL.6.1 Comprehension and collaboration • SL.8.5 Presentation of knowledge and ideas • RST.6-8.1 Key idea and details • RST.6-8.2 Key idea and details • RST.6-8.3 Key idea and details • RST.6-8.4 Craft and structure • RST.6-8.7 Integration of knowledge and ideas • RST.6-8.10 Range of reading and level of text complexity • WHST.6-8.1.b Text types and purposes • WHST.6-8.7 Research to build and present knowledge CCSS for Math: • MP2 Reason abstractly and quantitatively. • MP4 Model with mathematics. • MP5 Use appropriate tools strategically. • MP7 Look for and make use of structure. • 6.SPB.4 Summarize and describe distributions. • 6.SPB.5A Summarize and describe distributions. • 6.EE2.C Apply and extend previous understandings of arithmetic to algebraic expressions. • 6.EE.9 Represent and analyze quantitative relationships between dependent and independent variables.	https://carolinascienceonline.com/#/teacher/product-lines/STC/products/580651d37d7f8024e43ba5b2?page=3&play Supplements: Phenomenal GRC Lessons (Gather, Reason, Communicate Investigations) https://sites.google.com/3d-grcscience.org/going3d/home Gizmos Online Investigations Explorelearning.com	Vocabulary Spelling City: (classwork/Quiz Grade) Spellingcity.com Edulastic (online formative and summative 3D Assessments) App.edulastic.com

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Modifications	
Special Education/ 504:	**English Language Learners:**
• Adhere to all modifications and health concerns stated in each IEP. • Give students a MENU of options, allowing them to choose assignments from different levels based on difficulty. • Accommodate Instructional Strategies: use of post-its, reading aloud text, graphic organizers, one-on-one instruction, class website (Google Classroom), handouts, definition list with visuals, extended time • Allow extra time to complete assignments or tests • Allow students to demonstrate understanding of a problem by drawing a functional model of the answer and then explaining the reasoning orally and/or writing. • Provide breaks between tasks, use positive reinforcement, use proximity • Work in a small group • Use large print books, Braille, or digital texts Strategies for students with 504 plans	• Simplify written and verbal instructions • Use manipulatives to promote conceptual understanding and enhance vocabulary usage • Allow for alternate forms of responses- drawing or speaking instead of writing to demonstrate knowledge when you are not specifically assessing writing • Allow the use of an online dictionary to look up the definition and hear the pronunciation of unknown words • Provide graphic representations, gestures, drawings, equations, and pictures during all segments of instruction • Utilize program translations tools such as Snap and Read (if available) • Utilize graphic organizers which are concrete, pictorial ways of constructing knowledge and organizing information • Use sentence frames and questioning strategies so that students will explain their thinking/ process of how to solve real life problems. • Reword questions in simpler language • Provide class notes ahead of time to allow students to preview material and increase comprehension • Provide extended time

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Gifted and Talented:	Students at Risk for Failure:

• Organize and offer flexible small group learning opportunities / activities.
• Utilize elevated contextual complexity
• Inquiry based or open ended assignments, performance tasks and projects
• Allow more time to study concepts with greater depth
• Provide options, alternatives and choices to differentiate and broaden the curriculum.
• Promote the synthesis of concepts and making real world connections
• Provide students with enrichment practice that are imbedded in the curriculum
  ○ allowing students to design problems to be addressed by the class
  ○ allowing students to modify the lesson by introducing a related phenomena
  ○ allow for interest-based extension activities
• Utilize an enhanced set of introductory activities (e.g. phenomena, organizers, concept maps etc)
• Provide whole group enrichment explorations.
• Teach cognitive and methodological skills
• Allow for the use of stations
• Organize integrated problem-solving simulations.
	• Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum
	• Modify Instructional Strategies; extended time, reading aloud text, graphic organizers, flexible grouping, one-on-one instruction, class website (Google Classroom), inclusion of more visuals and manipulatives, Utilize Scaffolded Questioning, Field Trips, Google Expeditions, Peer Support, Modified Assignments, Chunking of Information, Peer Buddies
	• Assure constant parental/ guardian contact throughout the year with successes/ challenges
	• Provide academic contracts to students and guardians
	• Create an interactive notebook with samples, key vocabulary words, student goals/ objectives.
	• Always plan to address students at risk in the designing of learning tasks, instructions, and directions.
	• Try to anticipate where the needs will be and then address them prior to lessons.
	• Teacher should allow for preferential seating
	• Include Visual Cues/Modeling
	• Allow for technology Integration, especially Assistive Technology

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21st Century Life and Career Skills:

Career Ready Practices describe the career-ready skills that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. These skills enable students to make informed decisions that prepare them to engage as active citizens in a dynamic global society and to successfully meet the challenges and opportunities of the 21st century workplace. As such, they should be taught and reinforced in all career exploration and preparation programs, with increasingly higher levels of complexity and expectation as a student advances through a program of study.

https://www.state.nj.us/education/cccs/2014/career/9.pdf

- **CRP1**. Act as a responsible and contributing citizen and employee.
- **CRP2**. Apply appropriate academic and technical skills.
- **CRP3**. Attend to personal health and financial well-being.
- **CRP4**. Communicate clearly and effectively and with reason.
- **CRP5**. Consider the environmental, social and economic impacts of decisions.
- **CRP6**. Demonstrate creativity and innovation.
- **CRP7**. Employ valid and reliable research strategies.
- **CRP8**. Utilize critical thinking to make sense of problems and persevere in solving them.
- **CRP9**. Model integrity, ethical leadership and effective management.
- **CRP10**. Plan education and career paths aligned to personal goals.
- **CRP11**. Use technology to enhance productivity.
- **CRP12**. Work productively in teams while using cultural global competence.

Students are provided with an equitable opportunity to communicate with peers effectively, clearly, and with the use of technical language. They are also encouraged to reason through experiences and exposure to phenomena that promote critical thinking and emphasize the importance of perseverance. Students are exposed to various mediums of technology, such as digital learning, and educational websites.

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Technology Standards:

All students will be prepared to meet the challenge of a dynamic global society in which they participate, contribute, achieve, and flourish through universal access to people, information, and ideas.
https://www.state.nj.us/education/cccs/2014/tech/

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.

A. **Technology Operations and Concepts:** Students demonstrate a sound understanding of technology concepts, systems and operations.
B. **Creativity and Innovation:** Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
C. **Communication and Collaboration:** Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
D. **Digital Citizenship:** Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
E. **Research and Information Fluency:** Students apply digital tools to gather, evaluate, and use of information.
F. **Critical thinking, problem solving, and decision making:** Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

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. **The Nature of Technology: Creativity and Innovation-** Technology systems impact every aspect of the world in which we live.
B. **Technology and Society:** Knowledge and understanding of human, cultural, and societal values are fundamental when designing technological systems and products in the global society.
C. **Design:** The design process is a systematic approach to solving problems.
D. **Abilities in a Technological World:** The designed world in a product of a design process that provides the means to convert resources into products and systems.
E. **Computational Thinking: Programming-** Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.