Pine Hill Public Schools Curriculum			
Content Area:	Science		
Course Title/ Grade Level:	Grade 8		
Unit 1:	Energy	Duration:	8 weeks
Unit 2:	Forces and Interactions	Duration::	8 weeks
Unit 3:	Waves and Electromagnetic Radiation	Duration:	6 weeks
Unit 4:	Matter and Energy in Organisms and Ecosystems	Duration:	8 weeks
Unit 5:	Chemical Reactions	Duration:	8 weeks
Date Revision Approved:	August 15, 2017		
Initial BOE Approval Date:	August 23, 2016		

Pine Hill Public Schools Science Curriculum	
Unit Title: Energy	
Course or Grade Level: 8	Length of Time: 8 weeks
Essential Questions	● · How do changes in one part of an Earth system affect other parts of the system and in what ways do human interactions affect the system?
Content	● · Carbon Footprint ● · Types of Energy ● · Kinetic and Potential Energy ● · Law of Conservation of Energy ● · Scientific Method ● · Lab Safety ● · Fields of Scientific study ● · Measurements ● · Scientific Law & Theory
Skills	· Explain the effects that human living habits have on the planet · Identify ways to reduce our carbon footprint and conserve energy · Observe & Discuss Chernobyl Nuclear accident and its effects · Distinguish between different types of energy · Compare the kinetic and potential energy present in moving objects including a roller coaster · Demonstrate the Law of Conservation of Energy and how energy is conserved · Describe the conversion of energy from the sun to the fuel tank of an automobile · Identify the steps scientists often use to solve problems · Describe why scientists use variables · Compare & contrast science technology · Identify & convert SI units · Analyze data using the various types of graph · Know when and how to use appropriate safety equipment with all classroom materials. · Understand and practice safety procedures for conducting science investigations. · Distinguish between dependent & independent variables
Assessments	● · Conservation/Green Poster, Lab Reports, Tests, Quizzes, Experiments designed by the student, Student research & Prezi Project, Reading Comprehension Article

Inter-disciplinary Connections	· Math – interpret data for graphs · Social Studies – research and timelines for scientists, Chernobyl tragedy · Lang Arts – reading, writing, vocabulary
Lesson resources / Activities	· Energy Lab station materials · "Going Green" Article · Chernobyl slide show & video clip "Children of Chernobyl" · Paper Airplane Lab Experiment · Mythbusters "Can Sound Energy Break Glass?" Investigation · Physical Science; Glencoe-McGraw Hill Science 2002 · Resource box for book including tests, worksheets, enhancements, overhead transparencies · www.sciencespot.net for worksheets · teacher made flash cards for steps of scientific method and examples · Smartboard Lesson

New Jersey Student Learning Standards for Science

Science and Engineering Practices:	**Disciplinary Core Ideas:**
1. Asking questions (for science) and defining problems (for engineering) 2. Developing and using models 3. Planning and carrying out investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations (for science) and designing solutions (for engineering) 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	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.

Cross-Cutting Concepts:

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. (MS-PS3-1),(MS-PS3-4)**

Systems and System Models

- **Models can be used to represent systems and their interactions – such as inputs, processes, and outputs – and energy and matter flows within systems. (MS-PS3-2)**

Energy and Matter

- **Energy may take different forms (e.g. energy in fields, thermal energy, energy of motion). (MS-PS3-5)**
- **The transfer of energy can be tracked as energy flows through a designed or natural system. (MS-PS3-3)**

ELA/Literacy Companion Standards:

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.

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

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).

WHST.6-8.1 Write arguments focused on discipline content.

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.

SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.

Mathematics:

MP.2 Reason abstractly and quantitatively.

6.RP.A.1 Understand the concept of ratio and use ratio language to describe a ratio relationship between two quantities.

6.RP.A.2 Understand the concept of a unit rate a/b associated with a ratio a:b with $b \neq 0$, and use rate language in the context of a ratio relationship.

7.RP.A.2 Recognize and represent proportional relationships between quantities.

8.EE.A.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions.

8.EE.A.2 Use square root and cube root symbols to represent solutions to equations of the form x2 = p and x3 = p, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.

8.F.A.3 Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.

6.SP.B.5 Summarize numerical data sets in relation to their context.

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.

Pine Hill Public Schools Science Curriculum	
Unit Title: Forces and Interactions	
Course or Grade Level: 8	Length of Time: 8 weeks
Essential Questions	● · How are forensic science & physics used to examine a car crash and what happens to the occupants in the vehicle?
Content	● · Motion ● · Speed & Velocity ● · Motion graphs ● · Magnitude of force ● · Newton's 1st Law of Motion ● · Law of Inertia ● · Body Systems
Skills	· Define motion · Model and explain how the description of an object's motion from one observer's view may be different from another observer's view · Interpret motion graphs · Explain the difference between speed & velocity · Identify how acceleration, time, and velocity are related · Explain how (+) & (-) acceleration affect motion · Calculate the speed of an object when given distance & time · Compare the motion of an object of an object acted on by balanced forces with the motion of an object acted on by unbalanced forces in a given specific scenario · Describe what inertia is and how it is related to Newton's 1st Law of Motion · Identify the forces & motion that are present during a car crash · Identify body systems, review their functions and how they may be effected in a car accident
Assessments	● · Tests, Quizzes, Labs, Design a demonstration for Newton's 1st law of motion, Car Accident Time-Lapse Sketch Project

Inter-disciplinary Connections	· Lang Arts – reading, writing, vocabulary · Math – interpret data for graph, calculate speed
Lesson resources / Activities	· PS Ch2&3,LS –Ch19 pgs 546-549, Ch20 pgs574-577, 583-587, 600-608 · ES Ch10 pg284 · Physical Science; Glencoe-McGraw Hill Science 2002 · Resource box for book including tests, worksheets, enhancements, overhead transparencies · toy car, ramp, and raw egg to demonstrate importance of seatbelts · broom, plastic container, toilet tissue tube to demonstrate inertia · Mock Car Accident Police Report · Car & Occupant manipulatives & Diagrams · Brain, Skull, Spinal Cord, Spinal Column Activity · Smartboard Lesson

New Jersey Student Learning Standards for Science	
Science and Engineering Practices:	**Disciplinary Core Ideas:**
1. Asking questions (for science) and defining problems (for engineering) 2. Developing and using models 3. Planning and carrying out investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations (for science) and designing solutions (for engineering) 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	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.

Cross-Cutting Concepts:

Cause and Effect

- **Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-PS2-3),(MS-PS2-5)**

Systems and System Models

- **Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy and matter flows within systems. (MS-PS2-1),(MS-PS2-4)**

Stability and Change

- **Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales. (MS-PS2-2)**

ELA/Literacy Companion Standards:

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.

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

WHST.6-8.1 Write arguments focused on discipline-specific content.

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.

Mathematics:

MP.2 Reason abstractly and quantitatively.

6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values; use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

6.EE.A.2 Write, read, and evaluate expressions in which letters stand for numbers.

7.EE.B.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form, using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.

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

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.

Pine Hill Public Schools Science Curriculum	
Unit Title: Forces & Gravity	
Course or Grade Level: 8	Length of Time: 8 weeks
Essential Questions	● · How can energy be transferred from one material to another? What happens to a material when energy is transferred to it? How does force shape and affect our Universe?
Content	● · Forces ● · Newton's 2nd & 3rd Laws of Motion ● · Friction & Air Resistance ● · Law of Gravitation ● · Mass & Weight ● · Momentum ● · Law of Conservation of Momentum
Skills	· Identify different types of forces · Describe the force between two magnets as the distance between them is changed · Explain how force, mass & acceleration are related · Describe the 3 different types of friction · Observe the effects of air resistance on falling objects · Predict the falling rate of various objects · Describe gravitational force · Distinguish between mass & weight · Predict how the gravitational force between two bodies would differ based on mass and distance between the objects

	· Describe the position of planets in their orbit based on planet mass · Predict what would happen to an orbiting object if gravity were changed · Explain why objects that are thrown or shot will follow a curved path. · Compare motion in a straight line w/ circular motion · Identify when action & reaction forces occur · Demonstrate how momentumit is conserved
Assessments	● · Tests, Quizzes, Labs, Design a demonstration for Newton's 2nd and 3rd law of motion, Physics Carols
Inter-disciplinary Connections	· Lang Arts – reading, writing, vocabulary · Math – interpret data for graphs ·
Lesson resources / Activities	· PS Ch3, ES Ch 24 & 25 · Physical Science; Glencoe-McGraw Hill Science 2002 · Forces Station · Forces Video Clip "Santa Claus vs. The Snowman" · BBC Website "Force, Mass & Acceleration" · To scale planet models · *Resource box for book including tests, worksheets, enhancements, overhead transparencies · Smartboard Lesson

New Jersey Student Learning Standards for Science	
Science and Engineering Practices:	**Disciplinary Core Ideas:**
1. Asking questions (for science) and defining problems (for engineering) 2. Developing and using models 3. Planning and carrying out investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations (for science) and designing solutions (for engineering) 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	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

Cross-Cutting Concepts:

Cause and Effect

- **Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-PS2-3),(MS-PS2-5)**

Systems and System Models

- **Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy and matter flows within systems. (MS-PS2-1),(MS-PS2-4)**

Stability and Change

- **Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales. (MS-PS2-2)**

ELA/Literacy Companion Standards:

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.

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

WHST.6-8.1 Write arguments focused on discipline-specific content.

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.

Mathematics:

MP.2 Reason abstractly and quantitatively.

6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values; use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

6.EE.A.2 Write, read, and evaluate expressions in which letters stand for numbers.

7.EE.B.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form, using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.

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

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.

Pine Hill Public Schools
Science Curriculum

Unit Title: Energy Conversion in the Body

Course or Grade Level: 8	Length of Time: 8 weeks
Essential Questions	● · How is matter transformed, and energy transferred/transformed in living systems?
Content	● · Chemical Potential Energy in the body ● · Energy/Food Webs ● · Diet & the Transfer of Energy ● · Calorie ●
Skills	· Illustrate the flow of energy through a community · Describe how energy is transferred in the human body · Identify parts of the digestive system and how they aid in transferring energy ·· Calculate individual energy expenditure · Define Calorie and identify the energy contained in food · Predict the amount of energy released from different foods
Assessments	● · Tests, Quizzes, Labs, Student Created Energy Webs, Personal Calorie Analysis,
Inter-disciplinary Connections	· Health, social studies
Lesson resources / Activities	· Phys text-ch4,5,12 Earth text-ch11,12 · Life text-ch18p518-535,ch22,ch23 · Physical Science; Glencoe-McGraw Hill Science 2002 · Nutrition Lab Stations: calorie table, digestive system puzzle, energy expenditure formula · Super Size Me Movie (Educational Version) · Almond/Popcorn Calorimeter Lab: almond, popcorn, clay, lighter water, beaker, calorimeter, needle, goggles · *Resource box for book including tests, worksheets, enhancements, overhead transparencies · Smartboard Lesson

New Jersey Student Learning Standards for Science	
Science and Engineering Practices:	**Disciplinary Core Ideas:**
1. Asking questions (for science) and defining	**LS1.A: Structure and Function** ● All living things are made up of cells, which is the smallest unit that can be said to be alive. An

problems (for engineering)

2. Developing and using models

3. Planning and carrying out investigations

4. Analyzing and interpreting data

5. Using mathematics and computational thinking

6. Constructing explanations (for science) and designing solutions (for engineering)

7. Engaging in argument from evidence

8. Obtaining, evaluating, and communicating information

organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). (MS-LS1-1)
- Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. (MS-LS1-2)
- 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. (MS-LS1-3)

LS1.B: Growth and Development of Organisms
- Animals engage in characteristic behaviors that increase the odds of reproduction. (MS-LS1-4)
- Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction. (MS-LS1-4)
- Genetic factors as well as local conditions affect the growth of the adult plant. (MS-LS1-5)

LS1.C: Organization for Matter and Energy Flow in Organisms
- 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. (MS-LS1-6)
- 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. (MS-LS1-7)

LS1.D: Information Processing
- 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. (MS-LS1-8)

PS3.D: Energy in Chemical Processes and Everyday Life
- 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. *(secondary to MS-LS1-6)*
- 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. *(secondary to MS-LS1-7)*

Cross-Cutting Concepts:

Cause and Effect
- **Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS1-8)**
- **Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability. (MS-LS1-4),(MS-LS1-5)**

Scale, Proportion, and Quantity
- **Phenomena that can be observed at one scale may not be observable at another scale. (MS-LS1-1)**

Systems and System Models

- **Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. (MS-LS1-3)**

Energy and Matter

- **Matter is conserved because atoms are conserved in physical and chemical processes. (MS-LS1-7)**
- **Within a natural system, the transfer of energy drives the motion and/or cycling of matter. (MS-LS1-6)**

Structure and Function

- **Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function. (MS-LS1-2)**

ELA/Literacy Companion Standards:

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

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

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).

WHST.6-8.1 Write arguments focused on discipline content.

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.

SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.

Mathematics:

MP.2 Reason abstractly and quantitatively.

MP.4 Model with mathematics.

6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems.

6.SP.B.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

6.SP.B.5 Summarize numerical data sets in relation to their context.

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.

Pine Hill Public Schools Science Curriculum	
Unit Title: Waves and Electromagnetic Radiation	
Course or Grade Level: 8	Length of Time: 8 weeks
Essential Questions	● · What is the electromagnetic spectrum? ● · How can energy be transmitted? ● · What is the relationship between the energy, wavelength and frequency of a wave? ●
Content	● · Electromagnetic spectrum ● · Wavelength ● · Frequency ● · Modulation ● · Amplitude ● · Reflection, absorption, transmission/propogation of waves through various substances * light bending ● · Spectroscopy
Skills	· Calculate wavelength, frequency and amount of energy of a wave · Document the uses of electromagnetic radiation in everyday activities · Create a visual representation of the electromagnetic spectrum · Describe the characteristics of EM and light waves · Identify relationships between sound and light
Assessments	● · Tests, Quizzes, Labs, Models, Student demonstrations
Inter-disciplinary Connections	· Math – spatial differences, units of measurement · Lang Arts – reading, writing, vocab Music - instruments and sounds made
Lesson resources / Activities	· TBD
New Jersey Student Learning Standards for Science	
Science and Engineering Practices:	**Disciplinary Core Ideas:**

1. Asking questions (for science) and defining problems (for engineering) 2. Developing and using models 3. Planning and carrying out investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations (for science) and designing solutions (for engineering) 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	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.

Cross-Cutting Concepts:Patterns

- **Graphs and charts can be used to identify patterns in data. (MS-PS4-1)**

Structure and Function

- **Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used. (MS-PS4-2)**
- **Structures can be designed to serve particular functions. (MS-PS4-3)**

ELA/Literacy Companion Standards:

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.
RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
WHST.6-8.1 Write arguments focused on discipline-specific content.
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.

Mathematics:

MP.2 Reason abstractly and quantitatively.
MP.4 Model with mathematics.
6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems.
7.RP.A.2 Recognize and represent proportional relationships between quantities.
8.F.A.3 Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.

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.

Pine Hill Public Schools Science Curriculum	
Unit Title: Phases/States of Matter & the Properties	
Course or Grade Level: 8	Length of Time: 8 weeks
Essential Questions	● · What are the states of matter? ● · How are they classified? ● · What are their properties & how do they bond?
Content	● · Kinetic theory ● · Particle movement & behavior ● · Atomic structure & mass ● · Periodical table ● · Types of bonds ● · Solutions & Mixtures ● · Metals/Non-metals ● · Acids, bases and their reactions
Skills	· Explain the kinetic theory of matter · Describe the particle movement in the 5 states of matter · Explain how gas exerts pressure on its container · Explain how a gas is affected when pressure, temperature, or volume is changed · Define substances & mixtures · Identify elements & compounds · Compare & contrast solutions, colloids & suspensions · Compare & contrast physical & chemical properties of a substance · Identify the names & symbols of common elements · Determine the identity of an unknown substance using data about substances' properties · Compare acids, bases and their reactions · Describe the electron cloud model of an atom · Explain how electrons are arranged in an atom · Compute the atomic mass & number of an atom · Explain the composition of the periodic table & the terms metal, nonmetal & metalloid · Use the periodic table to obtain information

	· density, melting point, boiling point, solubility, flammability, and odor · Endothermic and exothermic reactions
Assessments	● · Tests, Quizzes, Labs, Models, Student demonstrations
Inter-disciplinary Connections	· History- research and discuss Archimedes and Bernoulli · Math – balancing chemical equation calculations ·
Lesson resources / Activities	· Phys text-ch16-23,Life text-ch5 · Physical Science; Glencoe-McGraw Hill Science 2002 · *Life Science; Glencoe-McGraw Hill Science 2002 · *Resource box for book including tests, worksheets, enhancements, overhead transparencies · *chex mix, trail mix, balloons, magnetic atom models, empty soda bottles, ketchup packets,

New Jersey Student Learning Standards for Science

Science and Engineering Practices:	**Disciplinary Core Ideas:**
1. Asking questions (for science) and defining problems (for engineering) 2. Developing and using models 3. Planning and carrying out investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations (for science) and designing solutions (for engineering) 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	MS-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures. 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.

Cross-Cutting Concepts:Patterns

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

Cause and Effect

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

Scale, Proportion, and Quantity

- **Time, space, and energy phenomena can be observed at various scales using models to study**

systems that are too large or too small. (MS-PS1-1)

Energy and Matter

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

Structure and Function

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

ELA/Literacy Companion Standards:

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-PS2-1),(MSPS2-3)

RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. (MS-PS2-1),(MS-PS2-2),(MS-PS2- 5)

WHST.6-8.1 Write arguments focused on discipline-specific content. (MS-PS2-4)

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-PS2-1),(MS-PS2-2),(MS-PS2-5)

Mathematics:

MP.2 Reason abstractly and quantitatively.

MP.4 Model with mathematics.

6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems.

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.

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.