Pine Hill Public Schools Curriculum			
Content Area:	Science		
Course Title/ Grade Level:	7th Grade Science		
Unit 1:	Space Systems	Duration:	8 weeks
Unit 2:	History of Earth	Duration::	8 weeks
Unit 3:	Earth Systems	Duration:	8 weeks
Unit 4:	Weather and Climate	Duration:	8 weeks
Unit 5:	Human Impact	Duration:	6 weeks
Date Revision Approved:	August 15, 2017		
Initial BOE Approval Date:	August 23, 2016		

Pine Hill Public Schools Science Curriculum	
Unit Title: Space Systems	Unit #: 1
Course or Grade Level: 7th grade	Length of Time: 8 weeks
Essential Questions	· What causes the sun and moon to look different throughout the year? · How is Earth similar to and different from other planets/celestial bodies? · How do we know that things have energy? · To what extent does the exchange of energy within Earth drive geologic events on the surface? · What predictable, observable patterns occur as a result of the interaction between the Earth, Moon, and Sun? What causes these patterns · How do changes in one part of an Earth system affect other parts of the system?
Content	· Suns apparent motion across the sky · Physical characteristics of Earth (geologic layers and atmospheric layers) · Physical characteristics of other objects in the solar system · Rotation/revolution · Phases of the moon and eclipses · Causes of tides · Causes of seasons · Model of the solar system (S-E-M) · Comets, asteroids, space junk · Discovery of new planets (Kepler's Laws)
Skills	· Describe the internal composition of the Earth · Compare/contrast rotation and revolution · Compare/contrast solstice and equinox · Clarify and discuss the misconceptions behind why the season changes occur on Earth · Describe, define, draw and detect the various phase changes that occur during a lunar month · Identify the characteristics of all 8 planets (3 dwarf planets) · Explain how Kepler's Law is used to discover new planets and bodies in the solar system · Diagram neap and spring tides

Assessments	· FORMATIVE: construct a model or drawing of relative positions of Sun, Earth, and Moon during various solar events (eclipse, solstice, equinox), label smart board diagrams, construct a 3-D model to demonstrate seasons in the different hemispheres · SUMMATIVE: webquest, student made calendar showing lunar phases during the month, test
Inter-disciplinary Connections	· History – research history of space travel and famous astronauts; what impact space travel has on society · Math – calculations for spherical shape of Earth, and discussion of formula for revolution and ellipses · Art – poster illustrating Sun-Earth-Moon spatial relationships during specific celestial events; · Music - listening to "The Planets" Holst · Language Arts – poetry inspired by the planets
Lesson resources / Activities	● Earth Science Glencoe ● Prentice Hall Science Explorer (Earth Science) ● McGraw Hill 2002 ● Resource box for book including tests, worksheets, enhancements, overhead transparencies · Teacher created smart board lessons · Brain Pop videos · Current Event Articles

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	**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.

8. Obtaining, evaluating, and communicating information	

Cross-Cutting Concepts:

Patterns

- Patterns can be used to identify cause-and-effect relationships.

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation.

Systems and System Models

- Models can be used to represent systems and their interactions.

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.**

Connections to Engineering,Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology

- **Engineering advances have led to important discoveries in virtually every field of science and scientific discoveries have led to the development of entire industries and engineered systems.**

ELA/Literacy Companion Standards:

RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts.

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).

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

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

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

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: Earth's History	Unit #: 2
Course or Grade Level: 7th grade	Length of Time: 8 weeks
Essential Questions	- How do people figure out that Earth's features and life on Earth have changed over time? - How does the movement of plate tectonics impact the surface of the Earth? Students will be able to describe Earth's formation and the layers of Earth, plate tectonics, faults, evidence supporting Plate Tectonic Theory, the geologic timescale, evidence that supports the history of the Earth, the processes that occur during the rock cycle, and predict weather given data after completing this unit.
Content	- Evolution of organisms (one-celled organisms to current) · Evolution of Earth's surface/environmental factors Mountain Formation Seafloor Spreading · Plate tectonics · Interpretation of Earth's history using fossil record and the concept Uniformitarianism · Continental Drift Theory - The geologic timescale is used to organize the Earth's history. • The surface of the Earth changes over time. • Faults in the surface of Earth indicate how he Earth has changed over time. • Erosion can be caused by wind, water, and ice. • The Theory of Plate Tectonics is supported by several pieces of evidence. • Rocks change over time, and these changes are described in the rock cycle. • Water goes through physical changes during the water cycle. • Factors like temperature and pressure influence changes in the weather, causing regional variations.
Skills	· Discuss natural selection and how it has shaped the Earth · Draw conclusions about how species adapted to changing environments over time

	· Relate changes of Earth's organisms to divisions on the geologic time scale · Create a timeline showing the divisions of geologic time · Explain the events that helped shape the Earth · Identify the characteristics of Precambrian, Paleozoic, Mesozoic, and Cenozoic Eras
Lesson resources / Activities	● Earth Science Glencoe ● Prentice Hall Science Explorer (Earth Science) ● Prentice Hall Science Explorer (Life Science) ● Resource box for book including tests, worksheets, enhancements, overhead transparencies ● Teacher created smart board lessons ● Brain Pop videos ● Current Event articles ● fossil collections ● 3D model of Earth

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-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. **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.
Cross-Cutting Concepts: **Patterns** ● Patterns can be used to identify cause-and-effect relationships.	

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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.

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

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

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Pine Hill Public Schools Science Curriculum		
Unit Title: Earth Systems		Unit #: 3
Course or Grade Level: 7	Length of Time: 8 weeks	
Essential Questions	· How does conservation of mass apply to the interaction of materials in a closed system? ● To what extent does the exchange of energy within the Earth drive geologic events on the surface? ● What is the role of the sun in energy transfer in the atmosphere and in the oceans? ● How is matter transformed, and energy transferred/transformed in living systems? ● In what ways do organisms interact within ecosystems?	
Content	● Photosynthesis (5.3.6.B.1) (5.2.8.B.2) ● Cellular respiration (5.3.6.B.1) (5.2.8.B.2) ● Ocean currents (5.4.8.E.1) ● Human impact on local and global environments (5.3.6.C.2) ● Air pollution ● Water pollution ● Water cycle ● Nitrogen cycle ● Carbon cycle	
Skills	● Diagram carbon, nitrogen and water cycles ● Write the equation for photosynthesis and respiration ● Create a bar graph showing CO_2 usage by families ● Conduct lab investigation	
Lesson resources / Activities	● Earth Science Glencoe ● Prentice Hall Science Explorer (Earth Science) ● McGraw Hill 2002 ● Resource box for book including tests, worksheets, enhancements, overhead transparencies · Teacher created smart board lessons · Brain Pop videos · Current Event articles	

New Jersey Student Learning Standards for Science	
Science and Engineering Practices:	**Disciplinary Core Ideas:**

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Cross-Cutting Concepts:

Patterns

- Patterns can be used to identify cause-and-effect relationships.

Connections to Nature of Science

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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).

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.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
7.RP.A.2 Recognize and represent proportional relationships between quantities.
6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
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.

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Pine Hill Public Schools Science Curriculum		
Unit Title: Weather and Climate		Unit #: 4
Course or Grade Level: 7		Length of Time: 8 weeks
Essential Questions	· How is energy transfer influenced by convection? · What is the relationship between daily temperature, air pressure, and relative humidity? · Where does local weather originate from? · How do land masses and bodies of water influence local and global climates? · How does Sun or wind energy influence the circulation of water in marine environments?	
Content	· Radiation and conduction · Convection or transfer of Sun heat throughout the atmosphere · Formation of convection currents · Air pressure, density · Temperature variations · Humidity · Climate · Global patterns and local weather · Influence of land masses and bodies of water on climate	

	· Influence of Sun or wind energy on circulation of water in marine environments.
Skills	· Explain why different latitudes on Earth receive different amounts of solar energy. · Compare and contrast radiation, conduction, and convection · Explain how solar heating and water vapor in the atmosphere affect weather. · Describe how rain, hail, sleet, and snow develop. · Describe how weather is associated with fronts and high- and low-pressure areas. · Explain how data are collected for weather maps and forecasts. · Identify symbols used in a weather station model. · Describe what determines climate. · Explain how latitude and other geographic factors affect the climate of a region. · Illustrate global winds and surface currents on a world map showing the relationship between the two.
Inter-disciplinary Connections	· Social Studies – history of trade winds and shipping, land masses, maps · Math – spatial differences, units of measurement · Language Arts – reading, writing, vocabulary ·
Lesson resources / Activities	· Earth Science Glencoe, Prentice Hall · Smart Board files, internet · Student notes, handouts · Maps

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)	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. MS-ESS2-5. Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.

7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	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.

Cross-Cutting Concepts:

Energy and Matter

- Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter.

Cause and Effect

- Cause and effect relationships may be used to predict phenomena in natural or designed systems.

Systems and System Models

- Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems.

ELA/Literacy Companion Standards:

RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts.

RST.6-8.9 Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

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.

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.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.

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

7.EE.B.4 Use variables to represent quantities in a real-world

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: Earth and Human Impact (Earthquakes/Geology)	Unit #: 5
Course or Grade Level: 7th	Length of Time: 8 weeks
Essential Questions	● How do changes in one part of an Earth system affect other parts of the system?
Content	● · Characteristics of igneous, metamorphic, and sedimentary rock ● · Rock Cycle as a model of the changes that a rock can undergo ● · Processes that rocks undergo during transformation from one form to another ● · Evidence of past geologic events through rock formations
Skills	● · Identify characteristics of igneous, metamorphic, and sedimentary rock ● · Describe the rock cycle and name processes that rocks undergo to become other rocks ● · Describe the conditions of the Earth that cause igneous, metamorphic, and sedimentary rocks to form ● · Model the rock cycle ● · Describe and classify rocks based on various physical and chemical characteristics ● · Identify rocks as basis of soil and everyday objects
Assessments	· FORMATIVE: observation/classifying rock samples, foldable/diagram of rock cycle, cross-curricular reading comprehension articles, quizzes · SUMMATIVE: Tests, Labs, Demonstrations (physical/chemical characteristics of rocks)
Inter-disciplinary Connections	● · Lang Arts – reading, writing, vocabulary ● · Social Studies – history of geologic formations and events
Lesson resources / Activities	· Earth Science Glencoe · Prentice Hall Science Explorer (Earth Science) · Resource box for book including tests, worksheets, enhancements, overhead transparencies · Teacher created smart board lessons

	· Brain Pop videos · Current Event articles · fossil collections · 3D model of Earth · Washington Collection Rock samples

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-ESS2-1. Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. 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-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

Cross-Cutting Concepts:

Patterns

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

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-ESS1-4),(MS-ESS2-2)**

ELA/Literacy Companion Standards:

RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts.
WHST.6-8.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
WHST.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research.
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.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.

6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
7.EE.B.4 Use variables to represent quantities in a real-world

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.