

Pine Hill Public Schools Curriculum

Content Area:	Science		
Course Title/ Grade Level:	6 th grade science		
Unit 1:	Matter	Duration:	1 month
Unit 2:	Cell Organization and Development	Duration:	2 months
Unit 3:	Heredity and Reproduction	Duration:	1 month
Unit 4:	Evolution and Diversity	Duration:	2 months
Unit 5:	Matter and Energy Transformation; Interdependence within Ecosystem	Duration:	2 months
Unit 6:	Energy in Earth Systems, Climate and Weather, Biochemical Cycles	Duration:	2 months
Unit 7:		Duration:	
BOE Approval Date:	August 23, 2011		

**Pine Hill Public Schools
Science Curriculum**

Unit Title: Matter		Unit #: 1
Course or Grade Level: 6 th		Length of Time:
Date Created:		BOE Approval Date:
Pacing	•	
Essential Questions	• How do the properties of materials determine their use?	
Content	<ul style="list-style-type: none"> • Density calculations • States of matter (Solid, Liquid, Gas) • Behavior of matter (molecule movement, volume, and shape) 	
Skills	<ul style="list-style-type: none"> • List the differences among atoms, elements, molecules and compounds • Demonstrate the relationship between volume and mass in terms of density of an object • Calculate density of objects using mass and volume • Determine the volume of water using water displacement • Explain that all matter is made up of atoms • Define matter • Compare/contrast the behavior of matter in terms of molecule movement, shape, and volume • Explain how molecule movement, shape, and volume change during the processes of heating and cooling • Explain relationship between elements, molecules, compounds and matter 	
Math Skills/ Science Processes	•	
Assessments	FORMATIVE: label diagrams of molecule movement in different states, worksheets on density calculation SUMMATIVE: poster presentation of relationship between elements, molecules, compounds and matter, water displacement lab activity	
Interventions / differentiated instruction	•	
Inter-disciplinary Connections	<ul style="list-style-type: none"> • Math • Language Arts 	
Lesson resources / Activities	<ul style="list-style-type: none"> • Smart board files • Internet resources 	

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Standard 5.2 Physical Science: Physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.

Strand(s): Strand A. Properties of Matter: All objects and substances in the natural world are composed of matter. Matter has two fundamental properties: matter takes up space, and matter has inertia.

Content Statement(s):		CPI # / CPI(s):	
Determine the volume of common objects using water displacement methods.		5.2.6.A.1	
Calculate the density of objects or substances after determining volume and mass.		5.2.6.A.2	
Explain that all matter is made of atoms, and give examples of common elements.		5.2.8.A.1	
Use the kinetic molecular model to predict how solids, liquids, and gases would behave under various physical circumstances, such as heating or cooling.		5.2.8.A.3	
<u>21st Century Themes</u>			
Global Awareness	Financial, Economic, Business, and Entrepreneurial Literacy	Civic Literacy	Health Literacy
<u>21st Century Skills</u>			
Creativity and Innovation	Critical Thinking and Problem Solving	Communication and Collaboration	Information Literacy
Media Literacy	ICT Literacy	Life and Career Skills	

**Pine Hill Public Schools
Science Curriculum**

Unit Title: Cell Organization and Development		Unit #: 2
Course or Grade Level: 6	Length of Time:	
Date Created:	BOE Approval Date:	
Pacing		
Essential Questions	<ul style="list-style-type: none"> • How are functions of plant and animal cells carried out by organelles? • What are the differences between single-celled and multi-celled organisms? • How do specialized cells form structures of cells, tissue, organs, and organ systems • How are the systems of the human body interrelated to regulate the body's internal environment? 	
Content	<ul style="list-style-type: none"> • Functions and parts of cells. • Single-celled, multi-celled organisms • Cell nucleus. • Cell structures – tissue, organs, organ systems • Cell theory, cell research • Homeostasis 	
Skills	<ul style="list-style-type: none"> • Identify names and functions of each part of a cell. • Compare tissues, organs, and organ systems. • Compare characteristics of single-celled and multi-celled organisms. • Proper use of microscope. • Summarize discoveries that led to the development of the cell theory. 	
Math Skills/ Science Processes		
Assessments	<p>Formative: Lab notes, cell booklets differentiating plant and animal cells</p> <p>Summative: Labs notebooks, Construct, Construct and present cell models</p>	
Interventions / differentiated instruction	<ul style="list-style-type: none"> • 	
Inter-disciplinary Connections	<ul style="list-style-type: none"> • Math – spatial differences, units of measurement • History – sequence of microscope, development of cell theory • Lang Arts – reading, writing, vocab 	
Lesson resources / Activities	<ul style="list-style-type: none"> • Life Science Glencoe; Prentice Hall • Smart board files, internet resources • Resource box for book including tests, worksheets, enhancements, • rulers, thermometers, graduated cylinders, meter sticks, beakers, triple beam balances • teacher made flash cards for steps of scientific method and examples 	
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Standard: 5.3.A Life Science

Strand(s): A. Organization and Development: Living organisms are composed of cellular units (structures) that carry out functions required for life. Cellular units are composed of molecules, which also carry out biological functions.

Content Statement(s):	CPI # / CPI(s):
<p><u>5.3.6.A.1</u> Systems of the human body are interrelated and regulate the body’s internal environment</p> <p><u>5.3.6.A.2</u> Essential function of plant and animal cells are carried out by the organelles</p> <p><u>5.3.8.A.1</u> All organisms are composed of cell(s). In multi-cellular organisms, specialized cells perform specialized functions. Tissues, organs, and organ systems are composed of cells and function to serve the needs of cells for food, air, and waste removal.</p>	<p><u>5.3.6.A.1:</u> Model the interdependence of the human body’s major systems in regulating its internal environment</p> <p><u>5.3.6.A.2:</u> Model and explain ways in which organelles work together to meet the cell’s needs.</p> <p><u>5.3.8.A.1:</u> Relate the structures of cells, tissues, organs, and systems to their functions in supporting life.</p>

Standard: 5.3.A Life Science Organization and Development

Strand(s):

Content Statement(s):	CPI # / CPI(s): 5.3.6.A.1; 5.3.6.A.2
	5.3.8.A.1; 5.3.8.A.2

21st Century Themes

Global Awareness	Financial, Economic, Business, and Entrepreneurial Literacy	Civic Literacy	Health Literacy
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21st Century Skills

Creativity and Innovation	Critical Thinking and Problem Solving	Communication and Collaboration	Information Literacy
Media Literacy	ICT Literacy	Life and Career Skills	

**Pine Hill Public Schools
Science Curriculum**

Unit Title: Heredity and Reproduction		Unit #: 3
Course or Grade Level: 6		Length of Time:
Date Created:		BOE Approval Date:
Pacing		
Essential Questions	<ul style="list-style-type: none"> • How is the survival of a species dependent upon reproduction? • Why do variations exist among same generation and different generations of a species? • How do inherited traits differ from acquired traits? • What is the difference between sexual and asexual reproduction? • How do environmental and/or inherited factors influence characteristics of an organism? 	
Content	<p>Mitosis</p> <ul style="list-style-type: none"> • Mitosis in plant and animal cells • Asexual reproduction • Meiosis, production of sex cells • Cell involved in fertilization • DNA • Inherited traits/acquired traits • Mendel's role in genetics • Punnett Square • Genetic variation, environmental factors 	
Skills	<ul style="list-style-type: none"> • Explain function and steps of mitosis • Compare mitosis in plant and animal cells. • List examples of asexual reproduction. • Describe stages of meiosis and how sex cells are produced. • Explain why meiosis is needed for sexual reproduction. • Identify the parts of the DNA model. • Distinguish between inherited and acquired traits/characteristics. • Explain how genetic traits are passed from one generation to the next through reproduction using evidence collected from observations of inherited traits. • Explain variations among siblings using a Punnett Square model. • Describe how environmental factors affect or alter effects of genes. 	
Math Skills/ Science Processes	<ul style="list-style-type: none"> • 	
Assessments	<p>Timeline models of mitosis and meiosis. Lab experiments – extracting DNA. Lab notebooks, tests, quizzes. Construct a Punnett square.</p> <ul style="list-style-type: none"> • 	

Interventions / differentiated instruction	•
Inter-disciplinary Connections	<ul style="list-style-type: none"> • Lang Arts – reading, writing, vocabulary • Math – probability and statistics
Lesson resources / Activities	<ul style="list-style-type: none"> • Life Science Glencoe- • McGraw Hill 2002 • *Resource box for book including tests, worksheets, enhancements, overhead transparencies • Smiley face genetics www.sciencspot.net

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Standard: 5.3.A Life Science: All student

Strand(s): D Heredity and Reproduction: Organisms reproduce, develop, and have predictable life cycles. Organisms contain genetic information that influences their traits, and they pass this on to their offspring during reproduction.

<p>Content Statement(s): <u>5.3.6.D.1</u> Reproduction is essential to the continuation of every species <u>5.3.8.D.1</u> Some organisms reproduce asexually. In these organisms, all genetic information comes from a single parent. Some organisms reproduce sexually, through which half of the genetic information comes from each parent. <u>5.3.8.D.2</u> The unique combination of genetic material from each parent in sexually reproducing organisms results in the potential for variation. <u>5.3.8.D.3</u> Characteristics of organisms are influenced by heredity and/or their environment</p>	<p>CPI # / CPI(s): <u>5.3.6.D.1:</u> Predict the long-term effect of interference with normal patterns of reproduction <u>5.3.8.D.1:</u> Defend the principle that, through reproduction, genetic traits are passed from one generation to the next, using evidence collected from observations of inherited traits. <u>5.3.8.D.2:</u> Explain the source of variation among siblings <u>5.3.8.D.3:</u> Describe the environmental conditions or factors that may lead to a change in a cell’s genetic information or to an organism’s development, and how these changes are passed on.</p>
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21st Century Themes

Global Awareness	Financial, Economic, Business, and Entrepreneurial Literacy	Civic Literacy	Health Literacy
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21st Century Skills

Creativity and Innovation	Critical Thinking and Problem Solving	Communication and Collaboration	Information Literacy
Media Literacy	ICT Literacy	Life and Career Skills	

**Pine Hill Public Schools
Science Curriculum**

Unit Title: Evolution and Diversity		Unit #: 4
Course or Grade Level: 6		Length of Time:
Date Created:		BOE Approval Date:
Pacing		
Essential Questions	<ul style="list-style-type: none"> • How do environmental conditions affect survival or individual organisms or entire species? • How does natural selection lead to evolution? • How do new species form? • How can adaptation allow a species to survive or cause a species to become extinct? • How can anatomical evidence of fossils support evolution? 	
Content	<ul style="list-style-type: none"> • Evolution • Darwin’s theory • Natural selection • Variations in organisms • Adaptations • Fossil evidence 	
Skills	<ul style="list-style-type: none"> • Describe Darwin’s theory of evolution. • Identify why variations in organisms are important. • Describe the differences among living primates. • Identify the adaptations of primates. • Construct a geologic time scale showing evolution of organisms. • Investigate how natural selection can lead to changes in a species over time using a model. 	
Math Skills/ Science Processes	<ul style="list-style-type: none"> • 	
Assessments	<p>Formative: Adaptation lab (bird beaks), student notes, outlines,</p> <p>Summative: Drawing conclusions from adaptation lab activities, designing an experiment investigating natural selection, interpreting geologic time scale</p>	
Interventions / differentiated instruction	<ul style="list-style-type: none"> • 	
Inter-disciplinary Connections	<ul style="list-style-type: none"> • Math – units of measurement, charts, graphs • Social Studies – geologic time lines • Language Arts - reading, writing, vocabulary 	

Lesson resources / Activities	<ul style="list-style-type: none"> • Life Science Glencoe; Prentice Hall • Smart board files, internet resources • Student notes, handouts • Evolution videos (Bill Nye)
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Standard: 5.3

Strand(s): 5.3.C Forms of Energy: Knowing the characteristics of familiar forms of energy, including potential and kinetic energy, is useful in coming to the understanding that, for the most part, the natural world can be explained and is predictable.

5.3.E Forces and Motion: It takes energy to change the motion of objects. The energy change is understood in terms of forces.

<p>Content Statement(s): <u>5.3.6.C.2:</u> The number of organisms and populations an ecosystem can support depends on the biotic resources available and on abiotic factors, such as quantities of light and water, range of temperatures, and soil composition. <u>5.3.6.C.3:</u> All organisms cause changes in the ecosystem in which they live. If this change reduces another organism's access to resources, that organism may move to another location or die. <u>5.3.8.C.1</u> Symbiotic interactions among organisms of different species can be classified as: -producer/consumer -predatory/prey -parasite/host -scavenger/prey -decomposer/prey <u>5.3.6.E.1:</u> Changes in environmental condition can affect the survival of individual organisms and entire species <u>5.3.8.E.1:</u> Individual organisms with certain traits are more likely than others to survive and have offspring in particular environments. The advantages or disadvantages of specific characteristics can change when the environment in which they exist changes. Extinction of a species occurs when the environment changes and the characteristics of a species are insufficient to allow survival.</p>	<p>CPI # / CPI(s): 5.3.6.C.2 Predict the impact that altering biotic and abiotic factors has on an ecosystem 5.3.6.C.3 Describe how one population of organisms may affect other plants and/or animals in an ecosystem 5.3.8.C.1 Model the effect of positive and negative changes in population size on a symbiotic pairing 5.3.6.E.1 Describe the impact on the survival of species during specific times in geologic history when environmental conditions changed 5.3.8.E.1 Organize and present evidence to show how the extinction of a species is related to an inability to adapt to changing environmental conditions using quantitative and qualitative data</p>
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Standard: 5.3.E Evolution and Diversity

Strand(s):

Content Statement(s):	CPI # / CPI(s): 5.3.6.E.1;
	5.3.8.E.1; 5.3.8.E.2

	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
<u>21st Century Skills</u>							
	Creativity and Innovation		Critical Thinking and Problem Solving		Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy		Life and Career Skills		

**Pine Hill Public Schools
Science Curriculum**

Unit Title: Matter and Energy Transformation; Interdependence within Ecosystem		Unit #: 5
Course or Grade Level: 6		Length of Time:
Date Created:		BOE Approval Date:
Pacing		
Essential Questions	<ul style="list-style-type: none"> • How are plants producers of their own energy? • How can energy flow through a community? • How can altering the biotic and/or the abiotic factors impact an ecosystem in which they live? • In what way can a change in the population of an ecosystem positively or negatively affect the symbiotic relationships of organisms? 	
Content	<ul style="list-style-type: none"> • Producers and consumers • Photosynthesis and respiration • Biotic and abiotic factors • Energy flow in an ecosystem – food chain, food web • Symbiotic relationships • Population shifts and impact on ecosystems 	
Skills	<ul style="list-style-type: none"> • List differences between producers and consumers • Explain energy release process in photosynthesis and respiration • Explain the relationship between abiotic and biotic factors in an ecosystem • Model/illustrate the flow of energy through a community. • Predict the impact of altering biotic and abiotic factors in an ecosystem. • Describe how a shift in one population in a community can alter the make-up of that community. 	
Math Skills/ Science Processes	<ul style="list-style-type: none"> • 	
Assessments	<p>Formative: charts, photosynthesis/respiration illustrations, food chain illustrations</p> <p>Summative: Demonstration of photosynthesis and respiration, model of changes in ecosystem.</p>	
Interventions / differentiated instruction	<ul style="list-style-type: none"> • 	

Inter-disciplinary Connections	<ul style="list-style-type: none"> • Math – spatial differences, units of measurement • Language Arts – reading, writing, vocabulary • Social Studies – population shifts
Lesson resources / Activities	<ul style="list-style-type: none"> • Glencoe, Prentice Hall • Smart board files, internet • Food chain/web posters • Energy flow models • Flower models - photosynthesis

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Standard: 5.3.B Matter and Energy Transformation, 5.3.C Interdependence

Strand(s):

Content Statement(s):

CPI # / CPI(s): 5.3.6.B.1; 5.3.6.B.2

5.3.6.C.2; 5.3.6.C.3; 5.3.8.C.1

21st Century Themes

	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
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21st Century Skills

	Creativity and Innovation		Critical Thinking and Problem Solving		Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy		Life and Career Skills		

**Pine Hill Public Schools
Science Curriculum**

Unit Title: Energy in Earth Systems, Climate and Weather, Biochemical Cycles		Unit #: 6
Course or Grade Level: 6		Length of Time:
Date Created:		BOE Approval Date:
Pacing		
Essential Questions	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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. 	
Math Skills/ Science Processes	<ul style="list-style-type: none"> • 	
Assessments		

Interventions / differentiated instruction	•
Inter-disciplinary Connections	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Earth Science Glencoe, Prentice Hall • Smart Board files, internet • Student notes, handouts • Maps

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Standard: 5.4.E Energy in Earth Systems, 5.4.F Climate and Weather, 5.4.G Biogeochemical Cycles

Strand(s):

Content Statement(s):

CPI # / CPI(s): 5.4.6.E.1

5.4.6.F.1; 5.4.6.F.2; 5.4.8.F.1; 5.4.8.F.2

5.4.6.G.1

21st Century Themes

	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
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21st Century Skills

	Creativity and Innovation		Critical Thinking and Problem Solving		Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy		Life and Career Skills		

Revised: August 28,2012