

Pine Hill Public Schools Curriculum

Content Area:	Science		
Course Title/ Grade Level:	Honors Biology / Grade 9		
Unit 1:	Course Overview & Lab Safety	Duration:	1 week
Unit 2:	Scientific Method	Duration:	1-2 weeks
Unit 3:	Themes of Biology and Characteristics of Life	Duration:	1 week
Unit 4:	Structure and Function of Cells	Duration:	1-2 weeks
Unit 5:	Cell Membrane and Cell Transport	Duration:	1-2 weeks
Unit 6:	Inorganic Chemistry	Duration:	1-2 weeks
Unit 7:	Organic Chemistry	Duration:	1-2 weeks
Unit 8:	Energy and Enzymes	Duration:	1-2 weeks
Unit 9:	Cellular Respiration and Photosynthesis	Duration:	1-2 weeks
Unit 10:	Cell Division/Cell Cycle	Duration:	1 week
Unit 11:	Meiosis and Heredity	Duration:	2-3 weeks
Unit 12:	DNA Replication and Protein Synthesis	Duration:	2-3 weeks
Unit 13:	Biotechnology	Duration:	1-2 weeks
Unit 14:	Evolution	Duration:	1-2 weeks
Unit 15:	Ecology	Duration:	1-2 weeks
Unit 16:	Human Impacts	Duration:	1-2 weeks
BOE Approval Date:	August 23, 2011		

Pine Hill Public Schools Science Curriculum	
Unit Title: Course Overview & Lab Safety	Unit #: 1
Course or Grade Level: Honors Lab Bio (9th)	Length of Time: 1 wk.
Pacing	Dependent upon student comprehension, school calendar, and benchmark/state testing.
Essential Questions	<ul style="list-style-type: none"> • Why is it important to conduct experiments in a safe fashion? • Why is it important to know where the various areas of safety equipment are in the science classroom? • Why is it important to respond appropriately to a safety emergency in the science classroom? • What are the classroom procedures and guidelines in order to be successful? • How can terms be defined using root words?
Content	<ul style="list-style-type: none"> • Root Words • Personal safety • Equipment safety • Lab procedures • Course Outline <ul style="list-style-type: none"> - Book intro - Course overview - Grading procedures - Safety
Skills	<ul style="list-style-type: none"> • Determine the meaning of scientific terminology by utilizing the Greek/Latin root words. • Understand the course objectives • Understand the course sequence • Understand the classroom procedures and rules • Introduce lab safety procedures • Develop an understanding of inquiry based science • Perform experiments using proper safety procedures
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Scientific Measurement/Notation • Math word problems • Algebra application • Probability • Graphing • Data analysis
Assessments	<ul style="list-style-type: none"> • Homework/class work • Lab safety evaluation • Performance during lab experiments • Safety implementation during a laboratory experiment

Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice of tests • Include hands-on activities • Provide material at student's level of functioning • Use multi sensory approach
Inter-disciplinary Connections	<ul style="list-style-type: none"> • Mathematical connections • Connection to English • Science and society • Scientific discoveries and the link to Ethics
Lesson resources / Activities	<ul style="list-style-type: none"> • Hands-on activities • Laboratories related to the subject matter • Word processing systems • Computer access

2009 NJCCCS

Standard: 5.1

Strand(s): D

Content Statement(s):

CPI # / CPI(s):

Demonstrate how to use scientific tools and instruments and knowledge of how to handle animals with respect for their safety and welfare.

21st Century Themes

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

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: Scientific Method		Unit #:2
Course or Grade Level: Honors Lab Bio (9th)		Length of Time: 1-2wks.
Pacing	Dependent upon student comprehension, school calendar, and benchmark/state testing.	
Essential Questions	<ul style="list-style-type: none"> • What is the relationship between the advancement of science alongside the advancement of technology? • What is the process of the scientific method? • How can the scientific method be used in science, as well as, every day life? • What are the important elements in a valid scientific experiment (control group, experiment group, independent/dependent variables) 	
Content	<ul style="list-style-type: none"> • Scientific Method • The process of the scientific method • Independent/ Dependent variables • Control Group vs. Experimental Group • Lab Safety • Lab Report Writing Skills • Inquiring, observing, and discovering as a way to build science knowledge from the known to the unknown • Root Words Related to Topic 	
Skills	<ul style="list-style-type: none"> • Identify and explain the process of the scientific method. • Design and perform experiments using the scientific method • Demonstrate inquiry-based skills while implementing the scientific method. • Describe the relationship between advancements in science and technology. • Demonstrate proper safety procedures in the laboratory • Understand the difference between independent and dependent variables • Properly utilize scientific instruments 	
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Scientific Measurement/Notation • Math word problems • Algebra application • Probability • Graphing • Data analysis 	
Assessments	<ul style="list-style-type: none"> • Lab Safety Evaluation (100% mandatory) • Scientific Method Activities • Homework/class work • Unit test/ quizzes 	
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice of tests • Include hands-on activities • Provide material at student's level of functioning • Use multi sensory approach 	

Inter-disciplinary Connections	<ul style="list-style-type: none"> • Mathematical connections • Connection to English • Science and society • Scientific discoveries and the link to Ethics
Lesson resources / Activities	<ul style="list-style-type: none"> • Hands-on activities • Laboratories related to the subject matter • Word processing systems • Computer access • Dissection (after standardized exam)

2009 NJCCCS

Standard: 5.1

Strand(s): D

Content Statement(s):

CPI # / CPI(s):

Demonstrate how to use scientific tools and instruments and knowledge of how to handle animals with respect for their safety and welfare.

21st Century Themes

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

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:	Themes of Biology and Characteristics of Life
	Unit #: 3
Course or Grade Level:	Honors Lab Bio (9th)
	Length of Time: 1 wk.
Pacing	Dependent upon student comprehension, school calendar, and benchmark/state testing.
Essential Questions	<ul style="list-style-type: none"> • How do the themes of biology unite the areas of study? • How are scientific practices/occupations implemented in the community? • What are some important biology oriented careers? • What are the essential characteristics that all living organisms share? • How does structure relate to function in living systems from the organism to the cellular level?
Content	<ul style="list-style-type: none"> • Activity involving characteristics of life • Characteristics of life handouts • Online research of science careers • Root Words Related to Topic
Skills	<ul style="list-style-type: none"> • Explain the themes which unite biology • Describe the characteristics of all life • Develop an understanding of inquiry based science • Computer skills involving research & technology • Understand and research scientific careers in the community • Book Familiarization and utilization
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Scientific Measurement/Notation • Math word problems • Algebra application • Probability • Graphing • Data analysis
Assessments	<ul style="list-style-type: none"> • Science Career Brochure • Chapter 1 Homework/Quiz
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice of tests • Include hands-on activities • Provide material at student's level of functioning • Use multi sensory approach
Inter-disciplinary Connections	<ul style="list-style-type: none"> • Mathematical connections • Connection to English • Science and society • Scientific discoveries and the link to Ethics

Lesson resources / Activities	<ul style="list-style-type: none"> • Hands-on activities • Laboratories related to the subject matter • Word processing systems • Computer access
--------------------------------------	---

2009 NJCCCS

Standard: 5.1

Strand(s): A,B,C,D

Content Statement(s):	CPI # / CPI(s):

21st Century Themes

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

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: Structure and Function of Cells		Unit #: 4
Course or Grade Level: Honors Lab Bio (9th)		Length of Time: 1-2 wks.
Pacing	Dependent upon student comprehension, school calendar, and benchmark/state testing.	
Essential Questions	<ul style="list-style-type: none"> • How have the advances in microscope technology affected the field of biology in cellular study? • How do the parts of the cell relate to the function of the cell as a unit? • What is the difference between prokaryotes and eukaryotes? Plant and animal cells? 	
Content	<ul style="list-style-type: none"> • Technology <ul style="list-style-type: none"> - Types of microscopes - Cell theory • Types of cells <ul style="list-style-type: none"> - Prokaryote - Eukaryote - Plant and animal cells • Parts of cell <ul style="list-style-type: none"> - Organelles - Structure and function of organelles 	
Skills	<ul style="list-style-type: none"> • Describe microscopes and use • Use a compound light microscope • Create a wet mount slide • Describe parts of the cell theory • Differentiate between prokaryotes and eukaryotes • Differentiate between animal and plant cells • Describe function of cell organelles 	
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Scientific Measurement/Notation • Math word problems • Algebra application • Probability • Graphing • Data analysis 	
Assessments	<ul style="list-style-type: none"> • Introductory Microscopy Lab • Plant and Animal Cell Lab • Unit Test/Quizzes 	
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice of tests • Include hands-on activities • Provide material at student's level of functioning • Use multi sensory approach 	

Inter-disciplinary Connections	<ul style="list-style-type: none"> • Mathematical connections • Connection to English • Science and society • Scientific discoveries and the link to Ethics
Lesson resources / Activities	<ul style="list-style-type: none"> • Hands-on activities • Laboratories related to the subject matter • Word processing systems • Computer access

2009 NJCCCS

Standard: 5.3

Strand(s): A. Organization and Development

Content Statement(s):

CPI # / CPI(s):

21st Century Themes

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

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: Cell Membrane and Cell Transport	
Unit #: 5	
Course or Grade Level: Honors Lab Bio (9th)	Length of Time: 1-2 wks.
Pacing	Dependent upon student comprehension, school calendar, and benchmark/state testing.
Essential Questions	<ul style="list-style-type: none"> • How are substances transported into and out of the cell to maintain homeostasis? • How do responses to external and internal stimuli lead to the survival of an organism?
Content	<ul style="list-style-type: none"> • Describe the major structure and functions of the cell membrane <ul style="list-style-type: none"> - Fluid Mosaic Model - Passive and Active Transport • Explain how the structure of the plasma membrane makes it semi-permeable • Describe and distinguish between the processes of diffusion/facilitated diffusion • Describe the types of passive transport and how they occur • Describe the types of active transport and how they occur • Compare and contrast hypertonic, hypotonic, and isotonic solutions
Skills	<ul style="list-style-type: none"> • Recognize that cell membranes are selectively permeable and maintain optimal internal conditions through transport • Predict a cell's response in a given set of environmental conditions • Conduct investigations and use results of measurements/observations to refine predictions and explanations
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Scientific Measurement/Notation • Math word problems • Algebra application • Probability • Graphing • Data analysis
Assessments	<ul style="list-style-type: none"> • Homework/Class work • quiz • test • Labs investigation osmosis and diffusion
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice of tests • Include hands-on activities • Provide material at student's level of functioning • Use multi sensory approach
Inter-disciplinary Connections	<ul style="list-style-type: none"> • Mathematical connections • Connection to English • Science and society • Scientific discoveries and the link to Ethics

Lesson resources / Activities	<ul style="list-style-type: none"> • Hands-on activities • Laboratories related to the subject matter • Word processing systems • Computer access 						
2009 NJCCCS							
Standard: 5.3							
Strand(s): A. Organization and Development							
Content Statement(s):				CPI # / CPI(s):			
Predict a cells response in a given set of environmental conditions.							
<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: Inorganic Chemistry	Unit #: 6
Course or Grade Level: Honors Lab Bio (9th)	Length of Time: 1-2 wks.
Date Created: 12-12-11	BOE Approval Date:
Pacing	Dependent upon student comprehension, school calendar, and benchmark/state testing.
Essential Questions	<ul style="list-style-type: none"> • Why is life studied at the atom and molecular level? • How can an atomic reactivity be determined by its placement in the periodic table and how is this important in terms of the type of chemical bond it will form? • What are the characteristics of water that give it the essential properties to life?
Content	<ul style="list-style-type: none"> • Periodic Table <ul style="list-style-type: none"> - Atom, Molecule, Element and Compound - Atomic Number, Atomic Mass and Isotopes - Types of Bonds and properties of each - Drawing types of bonds • Properties of Water <ul style="list-style-type: none"> - Cohesion and Hydrogen bonds - Solutes, Solvent and Solution • pH <ul style="list-style-type: none"> - how scale is used - how pH affects life
Skills	<ul style="list-style-type: none"> • Understand the differences between inorganic and organic compounds • Explain how functional groups identify properties of macromolecules • Identify types of functional groups • Explain how carbohydrates are used by the body • Explain how the non polar properties of lipids are essential for life • Explain the 7 types of proteins and how their shape determines function • Explain how enzymes are important to reduce energy needed for reactions to occur
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Scientific Measurement/Notation • Math word problems • Algebra application • Probability • Graphing • Data analysis
Assessments	<ul style="list-style-type: none"> • Chemical Aspects of Life Lab Amylase Lab • Unit: Test/ quizzes Life Lab • Lab Practical for Macromolecules Lab

Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice of tests • Include hands-on activities • Provide material at student's level of functioning • Use multi sensory approach
Inter-disciplinary Connections	<ul style="list-style-type: none"> • Mathematical connections • Connection to English • Science and society • Scientific discoveries and the link to Ethics
Lesson resources / Activities	<ul style="list-style-type: none"> • Hands-on activities • Laboratories related to the subject matter • Word processing systems • Computer access

2009 NJCCCS

Standard: 5.3

Strand(s): A. Organization and Development

Content Statement(s):

CPI # / CPI(s):

21st Century Themes

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

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: Organic Chemistry	Unit #: 7
Course or Grade Level: Honors Lab Bio (9 th)	Length of Time: 1-2 wks.
Pacing	Dependent upon student comprehension, school calendar, and benchmark/state testing.
Essential Questions	<ul style="list-style-type: none"> • Why is carbon essential for life? • How are functional groups used to identify properties of organic macromolecules? • What are the monomers of the 4 macromolecules and how do cells use each of them? • Why are shape and function of the macromolecule related?
Content	<ul style="list-style-type: none"> • Organic Compounds <ul style="list-style-type: none"> - Functional groups - Carbs - Lipids - Proteins Nucleic Acids
Skills	<ul style="list-style-type: none"> • Understand the differences between inorganic and organic compounds • Explain how functional groups identify properties of macromolecules • Identify types of functional groups • Explain how carbohydrates are used by the body • Explain how the non polar properties of lipids are essential for life • Explain the 7 types of proteins and how their shape determines function • Explain how enzymes are important to reduce energy needed for reactions to
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Scientific Measurement/Notation • Math word problems • Algebra application • Probability • Graphing • Data analysis
Assessments	<ul style="list-style-type: none"> • Chemical Aspects of Life Lab Amylase Lab • Unit: Test/ quizzes Life Lab • Lab Practical for Macromolecules Lab
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice of tests • Include hands-on activities • Provide material at student's level of functioning • Use multi sensory approach
Inter-disciplinary Connections	<ul style="list-style-type: none"> • Mathematical connections • Connection to English • Science and society • Scientific discoveries and the link to Ethics

Lesson resources / Activities	<ul style="list-style-type: none"> • Hands-on activities • Laboratories related to the subject matter • Word processing systems • Computer access 		
2009 NJCCCS			
Standard: 5.3			
Strand(s): B. Matter and Energy Transformations			
Content Statement(s):	CPI # / CPI(s):		
<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: Energy and Enzymes		Unit #: 8
Course or Grade Level: Honors Lab Bio (9th)		Length of Time: 1-2 wks.
Pacing	Dependent upon student comprehension, school calendar, and benchmark/state testing.	
Essential Questions	<ul style="list-style-type: none"> • How is energy transferred and transformed in living systems? • How do enzymes reduce the amount of energy needed by a cell? • How can enzymes be affected by changes in temp, pH or chemical factors? 	
Content	<ul style="list-style-type: none"> • Energy use • Types of reactions • ATP • Enzymes 	
Skills	<ul style="list-style-type: none"> • Describe how energy transfer occur in the cell • Differentiate between endergonic and exergonic reactions • Explain how ATP is used by the cell for energy • Describe how enzyme shape is critical to function • Explain why enzymes are essential to life 	
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Scientific Measurement/Notation • Math word problems • Algebra application • Probability • Graphing • Data analysis 	
Assessments	<ul style="list-style-type: none"> • Enzyme Lab • Diffusion Lab • Unit test/quizzes 	
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice of tests • Include hands-on activities • Provide material at student's level of functioning • Use multi sensory approach 	
Inter-disciplinary Connections	<ul style="list-style-type: none"> • Mathematical connections • Connection to English • Science and society • Scientific discoveries and the link to Ethics 	
Lesson resources / Activities	<ul style="list-style-type: none"> • Hands-on activities • Laboratories related to the subject matter • Word processing systems • Computer access • <i>Lorenzo's Oil</i> 	

2009 NJCCCS							
Standard: 5.3							
Strand(s): B. Matter and Energy Transformations							
Content Statement(s):				CPI # / CPI(s):			
<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: Cellular Respiration and Photosynthesis	
Unit #: 9	
Course or Grade Level: Honors Lab Bio (9th)	Length of Time: 2-4wks.
Pacing	Dependent upon student comprehension, school calendar, and benchmark/state testing.
Essential Questions	<ul style="list-style-type: none"> • How does the cell transfer energy from glucose to ATP during respiration? • How are oxidation-reduction reactions used throughout cellular respiration? • How are autotrophs and heterotrophs connected to each other through cellular respiration and photosynthesis? • How are plants capable of converting kinetic energy into chemical energy during photosynthesis?
Content	<ul style="list-style-type: none"> • Cellular Respiration <ul style="list-style-type: none"> - Aerobic vs. Anaerobic - Substrate level phosphorylation - Energy conversions during glycolysis, Krebs' cycle and ETC • Photosynthesis <ul style="list-style-type: none"> - Photosystems - Calvin Cycle
Skills	<ul style="list-style-type: none"> • Discuss how aerobic and anaerobic respiration are related. • Differentiate between substrate level phosphorylation and how each is used for energy conversion to ATP. • Describe the stages of cellular respiration and the importance of oxidation reduction reactions • Differentiate the energy needs of autotrophs and heterotrophs • Describe the stages of photosynthesis and the energy conversions that occur throughout • Explain how autotrophs and heterotrophs are ultimately reliant on each other for their energy needs •
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Scientific Measurement/Notation • Math word problems • Algebra application • Probability • Graphing • Data analysis
Assessments	<ul style="list-style-type: none"> • Fermentation Lab • Cellular Respiration Activity • Unit Tests/quizzes
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice of tests • Include hands-on activities • Provide material at student's level of functioning • Use multi sensory approach

Inter-disciplinary Connections	<ul style="list-style-type: none"> • Mathematical connections • Connection to English • Science and society • Scientific discoveries and the link to Ethics
Lesson resources / Activities	<ul style="list-style-type: none"> • Hands-on activities • Laboratories related to the subject matter • Word processing systems • Computer access

2009 NJCCCS

Standard: 5.3

Strand(s): B. Matter and Energy Transformations

Content Statement(s):

CPI # / CPI(s):

Investigate and describe the complementary relationship between photosynthesis and cellular respiration.

21st Century Themes

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

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: Cell Division/Cell Cycle		Unit #: 10
Course or Grade Level: Honors Lab Bio (9th)		Length of Time: 1 wk.
Pacing	Dependent upon student comprehension, school calendar, and benchmark/state testing.	
Essential Questions	<ul style="list-style-type: none"> • How is life dependent upon cell reproduction? • How are asexual and sexual reproduction different? • What happens when cells do not obey controls during cell division? 	
Content	<ul style="list-style-type: none"> • Asexual reproduction • Mitosis • Controls of cell cycle • Cancer 	
Skills	<ul style="list-style-type: none"> • Differentiate between sexual and asexual reproduction • Discuss importance of like begets like in mitosis. • Describe stages of the cell cycle in mitosis. • Discuss how cell growth is controlled by cell during division. • Discuss how cancer can develop from lack of cell controls during division. 	
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Scientific Measurement/Notation • Math word problems • Algebra application • Probability • Graphing • Data analysis 	
Assessments	<ul style="list-style-type: none"> • Mitosis Slide Lab • Unit Test/Quizzes 	
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice of tests • Include hands-on activities • Provide material at student's level of functioning • Use multi sensory approach 	
Inter-disciplinary Connections	<ul style="list-style-type: none"> • Mathematical connections • Connection to English • Science and society • Scientific discoveries and the link to Ethics 	
Lesson resources / Activities	<ul style="list-style-type: none"> • Hands-on activities • Laboratories related to the subject matter • Word processing systems • Computer access 	

Strand(s): D. Heredity and Reproduction							
Content Statement(s):							
Demonstrate through modeling how the sorting and recombination of genes during sexual reproduction has an effect on variation in offspring (meiosis, fertilization).					CPI # / CPI(s):		
Strand(s): D. Heredity and Reproduction							
Content Statement(s):							
<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: Meiosis and Heredity		Unit #: 11
Course or Grade Level: Honors Lab Bio (9th)		Length of Time: 2-3 wks.
Pacing	Dependent upon student comprehension, school calendar, and benchmark/state testing.	
Essential Questions	<ul style="list-style-type: none"> • How does meiosis promote genetic variation? • How can Punnett squares be used to predict genetic outcome of offspring? • How do chromosomes carry information in genes? • How can mutations within a gene lead to genetic disorders? 	
Content	<ul style="list-style-type: none"> • History of Genetics • Meiosis <ul style="list-style-type: none"> - Stages of cell cycle - Genetic variation • Genetic Inheritance <ul style="list-style-type: none"> - Monohybrid cross - Dihybrid cross - Multiple alleles - Codominance - Incomplete dominance • Genetic Disorders 	
Skills	<ul style="list-style-type: none"> • Describe the history of genetic through Mendel’s discoveries • Differentiate between phenotype and genotype • Create and interpret Punnett squares for monohybrid, dihybrid, incomplete dominance, codominance, multiple alleles and sex linked genetic crosses • Discuss how meiosis promotes genetic variation and link to natural selection • Discuss genetic disorders and advances in diagnosis and treatment 	
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Scientific Measurement/Notation • Math word problems • Algebra application • Probability • Graphing • Data analysis 	
Assessments	<ul style="list-style-type: none"> • Genetic Crosses Activities • Human Genetics Lab • Karyotype Lab • Genetic Disorder Project with presentations • Unit Test/Quizzes 	
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice of tests • Include hands-on activities • Provide material at student’s level of functioning • Use multi sensory approach 	

Inter-disciplinary Connections	<ul style="list-style-type: none"> • Mathematical connections • Connection to English • Science and society • Scientific discoveries and the link to Ethics
Lesson resources / Activities	<ul style="list-style-type: none"> • Hands-on activities • Laboratories related to the subject matter • Word processing systems • Computer access

2009 NJCCCS

Standard:5.3.12

Strand(s):D.3

Content Statement(s): Demonstrate through modeling how the sorting and recombination of genes during sexual reproduction has an effect on variation in offspring.

CPI # / CPI(s):

21st Century Themes

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

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: DNA Replication and Protein Synthesis	
Unit #: 12	
Course or Grade Level: Honors Lab Bio (9th)	Length of Time: 2-3 wks.
Pacing	Dependent upon student comprehension, school calendar, and benchmark/state testing.
Essential Questions	<ul style="list-style-type: none"> • Why is DNA the storehouse of information for heritable traits? • How is the information encoded by DNA translated into a protein? • What methods does a cell employ to ensure proper encoding?
Content	<ul style="list-style-type: none"> • History of DNA • Structure of DNA • DNA replication • Transcription Translation • Protein Synthesis • Gene Controls
Skills	<ul style="list-style-type: none"> • Describe the history of DNA • Draw the structure of DNA • Describe the process of DNA replication • Explain how proteins are made from DNA code
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Scientific Measurement/Notation • Math word problems • Algebra application • Probability • Graphing • Data analysis
Assessments	<ul style="list-style-type: none"> • Protein Synthesis Essay • DNA Extraction • Unit Tests/Quizzes
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice of tests • Include hands-on activities • Provide material at student's level of functioning • Use multi sensory approach
Inter- disciplinary Connections	<ul style="list-style-type: none"> • Mathematical connections • Connection to English • Science and society • Scientific discoveries and the link to Ethics
Lesson resources / Activities	<ul style="list-style-type: none"> • Hands-on activities • Laboratories related to the subject matter • Word processing systems

	<ul style="list-style-type: none"> • Computer access
--	---

2009 NJCCCS

Standard:5.3.12

Strand(s):E.3

	CPI # / CPI(s):

<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: Biotechnology		Unit #: 13
Course or Grade Level:		Length of Time: 1-2 wks.
Pacing	Dependent upon student comprehension, school calendar, and benchmark/state testing.	
Essential Questions	<ul style="list-style-type: none"> • What are current applications of biotechnology?? • How has the human genome project influenced biotechnology? • How has genetic engineering influenced the treatment for genetic disorders? 	
Content	<ul style="list-style-type: none"> • DNA fingerprinting • Restriction Enzymes • Electrophoresis • PCR • Gene Therapy • Recombinant DNA • Chromosome Map • Human Genome Project • Genetic Diseases 	
Skills	<ul style="list-style-type: none"> • Explain human genome project DNA fingerprinting • DNA fingerprinting analysis • Explain how biotechnology influences the field of genetic disorders 	
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Scientific Measurement/Notation • Math word problems • Algebra application • Probability • Graphing • Data analysis 	
Assessments	<ul style="list-style-type: none"> • DNA fingerprinting • Current Events in Biotechnology • Current Events in Human Genetic Diseases • Unit Tests/Quizzes 	
Interventions / differentiated instruction	<ul style="list-style-type: none"> -Provide advanced notice of tests -Include hands-on activities -Provide material at student's level of functioning -Use multi sensory approach 	
Inter-disciplinary Connections	<ul style="list-style-type: none"> - Mathematical connections - Connection to English - Science and society - Scientific discoveries and the link to Ethics 	

Lesson resources / Activities	-Homework/ Class work -Quiz -Test -Online activities - <i>GATACCA Movie</i>					
2009 NJCCCS						
Standard:5.3.12						
Strand(s):E.3						
					CPI # / CPI(s):	
<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: Evolution		Unit #: 14
Course or Grade Level: Honors Lab Bio (9th)		Length of Time: 1-2 wks.
Pacing	Dependent upon student comprehension, school calendar, and benchmark/state testing.	
Essential Questions	<ul style="list-style-type: none"> • What is the evidence to support natural selection? • How have the theories for evolutionary thought changed over time? 	
Content	<ul style="list-style-type: none"> • History of Evolutionary Thought • Charles Darwin and theory of Natural Selection • Mechanisms of evolution • Evidences of evolution • Microevolution • Macroevolution 	
Skills	<ul style="list-style-type: none"> • Explain how various views of evolution have progressed over time • Summarize Charles Darwin's Theory of Natural Selection • Identify modes of selection and mechanisms of evolution • Explain supporting evidence of microevolution and macroevolution 	
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Scientific Measurement/Notation • Math word problems • Algebra application • Probability • Graphing • Data analysis 	
Assessments	<ul style="list-style-type: none"> • Natural Selection Lab/Activity • Unit Tests/Quizzes 	
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice of tests • Include hands-on activities • Provide material at student's level of functioning • Use multi sensory approach 	
Inter-disciplinary Connections	<ul style="list-style-type: none"> • Mathematical connections • Connection to English • Science and society • Scientific discoveries and the link to Ethics 	

Lesson resources / Activities	<ul style="list-style-type: none"> • Hands-on activities • Laboratories related to the subject matter • Word processing systems • Computer access 						
2009 NJCCCS							
Standard:5.3.12							
Strand(s):E.3							
Content Statement(s): Provide a scientific explanation for the history of life on Earth using scientific evidence.				CPI # / CPI(s):			
<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: Ecology		Unit #: 15
Course or Grade Level: Honors Lab Bio (9th)		Length of Time: 1-2 wks.
Pacing	Dependent upon student comprehension, school calendar, and benchmark/state testing.	
Essential Questions	<ul style="list-style-type: none"> • How do abiotic limiting factors affect the biotic component of an ecosystem? • How are biotic components of an ecosystem adapted for survival? • What affects the population growth of a community and its carrying capacity? 	
Content	<ul style="list-style-type: none"> • Biomes <ul style="list-style-type: none"> - Abiotic limiting factors - Biotic adaptations for survival • Population Study <ul style="list-style-type: none"> - Human Populations Studies - Growth Rate Calculations • Community – <ul style="list-style-type: none"> - Food Chains/Webs - Cycling of Matter and Energy - Adaptations for Survival • Learning Behaviors 	
Skills	<ul style="list-style-type: none"> • Describe how abiotic factors limit biotic component of an ecosystem • Describe the main terrestrial biomes • Explain how biotic communities have adapted for survival with feeding relationships, competition and predation • Compare and contrast life history patterns • Describe the stages of primary and secondary succession • Describe why energy flows in one directions while matter is cycled through an ecosystem • Explain how populations are measured • Calculate growth rate of population when given date • Describe changes in human population • Describe the 7 learning behaviors • Explain how behavior is an indicator of evolutionary adaptation 	
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Scientific Measurement/Notation • Math word problems • Algebra application • Probability • Graphing • Data analysis 	
Assessments	<ul style="list-style-type: none"> • Energy Pyramids & Rood Webs/Chains • Unit tests/Quizzes 	

Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice of tests • Include hands-on activities • Provide material at student's level of functioning • Use multi sensory approach
Inter-disciplinary Connections	<ul style="list-style-type: none"> • Mathematical connections • Connection to English • Science and society • Scientific discoveries and the link to Ethics
Lesson resources / Activities	<ul style="list-style-type: none"> • Hands-on activities • Laboratories related to the subject matter • Word processing systems • Computer access

2009 NJCCCS

Standard: 5.3

Strand(s): A. Organization and Development

Analyze the interrelationships and interdependencies among different organisms and explain how these relationships contribute to the stability of the ecosystem.

CPI # / CPI(s):

21st Century Themes

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

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: Human Impacts		Unit #: 16
Course or Grade Level: Honors Lab Bio (9th)		Length of Time: 1-2 wks.
Pacing	Dependent upon student comprehension, school calendar, and benchmark/state testing.	
Essential Questions	<ul style="list-style-type: none"> • How have human activities limited the natural cycles of materials? • What are the effects of increasing demands and decreasing supply of natural resources on global ecology? • What are the consequences of harvesting natural resources from an ecosystem? 	
Content	<ul style="list-style-type: none"> • Natural Resources • Overpopulation and Ecological Footprint 	
Skills	<ul style="list-style-type: none"> • Describe how human activities have limited the natural cycles of materials • Describe the effect of increasing populations on natural resources • Explain how human activity has affected the cycling of matter and energy in the ecosystem • Describe how the natural environment has changed since humans have inhabited the Earth • Identify various forms of air, land and water pollution 	
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Scientific Measurement/Notation • Math word problems • Algebra application • Probability • Graphing • Data analysis 	
Assessments	<ul style="list-style-type: none"> • A Human Impact Research Project • Unit Tests/Quizzes 	
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice of tests • Include hands-on activities • Provide material at student's level of functioning • Use multi sensory approach 	
Inter-disciplinary Connections	<ul style="list-style-type: none"> • Mathematical connections • Connection to English • Science and society • Scientific discoveries and the link to Ethics 	

Lesson resources / Activities	<ul style="list-style-type: none"> • Hands-on activities • Laboratories related to the subject matter • Word processing systems • Computer access 						
2009 NJCCCS							
Standard: 5.3							
Strand(s): A. Organization and Development							
Analyze the interrelationships and interdependencies among different organisms and explain how these relationships contribute to the stability of the ecosystem.	CPI # / CPI(s):						
<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		

Revised: August 28, 2012