

Pine Hill Public Schools Curriculum

Content Area:	Science		
Course Title/ Grade Level:	Physics / 11 or 12		
Unit 1:	Mathematics of Physics	Month:	1 week
Unit 2:	Mathematics of Physics	Month:	8 weeks
Unit 3:	Newtonian Laws Of Motion	Month:	4 weeks
Unit 4:	Projectile Motion	Month:	1.5 weeks
Unit 5:	Two dimensional motion	Month:	1.5 weeks
Unit 6:	Laws of Conservation	Month:	1 week
Unit 7:	Work, Energy and Simple Machines	Month:	3 weeks
Unit 8:	Work, Energy and Simple Machines	Month:	1 week
Unit 9:	States of Matter	Month:	2 weeks
Unit 10:	Wave Characteristics	Month:	2 weeks
Unit 11:	Wave Characteristics	Month:	2.5 weeks
Unit 12:	Mirrors and Lenses	Month:	2 weeks
Unit 13:	Reflection and refraction	Month:	1 week
Date Created or Revised:	2011		
BOE Approval Date:	8/28/12		

**Pine Hill Public Schools
Science Curriculum**

Unit Title: Mathematics of Physics		Unit # 1 (CHAP 1)
Course or Grade Level: PHYSICS		Length of Time: 1 week
Pacing		
Essential Questions	<ul style="list-style-type: none"> • How do you communicate information that has a numerical format? • What are the ways that we treat numbers in measurements? • How can we make sure that we communicate what we are measuring? 	
Content	<ul style="list-style-type: none"> • Scalar and vector measurements • Essential parts of a graph • Types of measurements • Metric system • Significant digits • Rules for rounding measurements • Scientific notation • Scientific method of problem solving • Writing a lab report 	
Skills	<ul style="list-style-type: none"> • Display information and interpret information on various types of graphs (line graphs, histograms, pie charts...) • Express measurements using appropriate labels and units • Perform calculations and report answers with the appropriate amount of significant digits • Express measurements metric units • Express measurements in various magnitudes using metric prefixes • Use the rule for expressing answers to calculations with the correct number of significant digits • Express numbers in scientific notation • Analyze information using experimental error 	
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Express measurements with appropriate labels • Mathematically convert measurements into desired units to correctly solve problems • Input data into calculators for solving problems • Interpreting graphs and diagrams 	
Assessments	<ul style="list-style-type: none"> • Teacher evaluation of special projects • Quizzes and chapter test • Homework assignments • Experiments/reports 	
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice for tests • Present materials suitable to student's level of functioning • Include hands-on-activities 	
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 • Laboratory exercises related to subject matter • Chapter study guides • Oral presentation of chapter concepts 	
2009 NJCCCS		
Standard: 5.1, 5.2		
Strand(s): A,B,D, - E		
Content Statement(s):	CPI # / CPI(s): (1,2,3), (1), (2), (1)	

21st Century Themes

X	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
<u>21st Century Skills</u>							
	Creativity and Innovation	X	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: Mathematics of Physics		Unit # 2 (CHAP 2, 3,4)	
Course or Grade Level: PHYSICS		Length of Time: 8 weeks	
Pacing			
Essential Questions	<ul style="list-style-type: none"> • How can we express the motion of objects as they react to the forces in the world? 		
Content	<ul style="list-style-type: none"> • Scalar and vector measurements • Conversion factors • Average and instantaneous speed • Sign convention with vectors • Graphical analysis of motion • Newton's laws of motion • Effects of friction 		
Skills	<ul style="list-style-type: none"> • Differentiate between scalar and vector measurements • Solve vector problems using graphical techniques and computational methods • Calculate the resultant of two or more vector quantities • Resolve a vector into its horizontal and vector components • Use Newton's laws to calculate the characteristics of an object in linear motion • Determine the coefficient of friction from the forces acting on the object 		
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Express measurements with appropriate labels • Mathematically convert measurements into desired units to correctly solve problems • Input data into calculators for solving problems • Interpreting graphs and diagrams 		
Assessments	<ul style="list-style-type: none"> • Teacher evaluation of special projects • Quizzes and chapter test • Homework assignments • Experiments/reports 		
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice for tests • Present materials suitable to student's level of functioning • Include hands-on-activities 		
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 • Laboratory exercises related to subject matter • Chapter study guides • Oral presentation of chapter concepts 		

2009 NJCCCS

Standard: 5.1, 5.2

Strand(s): B,D, - E

Content Statement(s):

CPI # / CPI(s): (1), (2), (4)

21st Century Themes

X	Global Awareness		Financial, Economic, Business, and Entrepreneurial		Civic Literacy		Health Literacy
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			Literacy			
<u>21st Century Skills</u>						
	Creativity and Innovation	X	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: Newtonian Laws Of Motion		Unit # 3 (CHAP 5, 6)	
Course or Grade Level: PHYSICS		Length of Time: 4 weeks	
Pacing			
Essential Questions	<ul style="list-style-type: none"> • How can we predict the motion of an object that is subjected to external forces? 		
Content	<ul style="list-style-type: none"> • Newton's Laws of Motion • Mass and weight determination • Static and sliding friction • Motion of falling bodies • Vector analysis of motion 		
Skills	<ul style="list-style-type: none"> • Use Pythagorean Theorem and trig functions to determine the vector forces acting on an object • Determine the net force acting on an object allowing for frictional effects • Calculate the velocity, acceleration or position of a freely falling body • Construct a vector diagram to show the resultant acting on a body • Use vector addition to show the resultant force and the equilibrant • Solve incline plane problems using trig functions 		
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Express measurements with appropriate labels • Mathematically convert measurements into desired units to correctly solve problems • Input data into calculators for solving problems • Interpreting graphs and diagrams 		
Assessments	<ul style="list-style-type: none"> • Teacher evaluation of special projects • Quizzes and chapter test • Homework assignments • Experiments/reports 		
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice for tests • Present materials suitable to student's level of functioning • Include hands-on-activities 		
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 • Laboratory exercises related to subject matter • Chapter study guides • Oral presentation of chapter concepts 		

2009 NJCCCS

Standard: 5.1, 5.2

Strand(s): B,D - E

Content Statement(s):

CPI # / CPI(s): (1), (2), (1,4)

[21st Century Themes](#)

X	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
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[21st Century Skills](#)

X	Creativity and Innovation	X	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: Projectile Motion		Unit # 4(CHAP 7)	
Course or Grade Level: PHYSICS		Length of Time: 1.5 week	
Pacing			
Essential Questions	<ul style="list-style-type: none"> • How can we predict the motion of an object that is moving in two dimensions? 		
Content	<ul style="list-style-type: none"> • Principles of projectile motion • Independence of X and Y motion • Forces that cause circular motion • Simple Harmonic motion 		
Skills	<ul style="list-style-type: none"> • Use Pythagorean Theorem and trig functions to determine the vector forces acting on an object • Determine the net force acting on an object allowing for frictional effects • Calculate the velocity, acceleration or position of a body in projectile motion • Construct a vector diagram to show the resultant acting on a body • Determine max height and range for an object in projectile motion • Solve problems involving curcular motion 		
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Express measurements with appropriate labels • Mathematically convert measurements into desired units to correctly solve problems • Input data into calculators for solving problems • Interpreting graphs and diagrams 		
Assessments	<ul style="list-style-type: none"> • Teacher evaluation of special projects • Quizzes and chapter test • Homework assignments • Experiments/reports 		
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice for tests • Present materials suitable to student's level of functioning • Include hands-on-activities 		
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 • Laboratory exercises related to subject matter • Chapter study guides • Oral presentation of chapter concepts 		

2009 NJCCCS

Standard: 5.1, 5.2

Strand(s): B,D - E

Content Statement(s):

CPI # / CPI(s): (1), (2), (1,4)

[21st Century Themes](#)

X	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
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[21st Century Skills](#)

X	Creativity and Innovation	X	Critical Thinking and Problem Solving		Communication and Collaboration		Information Literacy
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	Media Literacy		ICT Literacy		Life and Career Skills
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**Pine Hill Public Schools
Science Curriculum**

Unit Title: Two dimensional motion		Unit # 5 (CHAP 8)
Course or Grade Level: PHYSICS		Length of Time: 1.5 week
Pacing		
Essential Questions	<ul style="list-style-type: none"> • How can we determine the motion of an object in two dimensions? • What is meant by simple harmonic motion? • What are the properties of an object in uniform circular motion? • How do planets and artificial satellites move? 	
Content	<ul style="list-style-type: none"> • Parabolic motion of a projectile • Motion of a spring and Hooke's Law • Pendulum motion • Motion of planets and artificial satellites • Kepler's Laws of Motion • The Universal Law of Gravitation 	
Skills	<ul style="list-style-type: none"> • Solve problems involving freely falling bodies • Solve problems for moving objects in two dimensions • Determine the position of a body moving with an initial velocity as it moves in two dimension • Calculate the velocity and acceleration of a body moving in two dimensions • Solve problems relating to the properties of a pendulum • Use the characteristics of a pendulum to determine the acceleration of gravity • Use Hooke's Law to explain the simple harmonic motion of a spring • Using Kepler's Laws determine the period and radius of an orbiting object • Apply Universal Law of Gravitation to determine the mass of an object or the distance it is from another object 	
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Express measurements with appropriate labels • Mathematically convert measurements into desired units to correctly solve problems • Input data into calculators for solving problems • Interpreting graphs and diagrams 	
Assessments	<ul style="list-style-type: none"> • Teacher evaluation of special projects • Quizzes and chapter test • Homework assignments • Experiments/reports 	
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice for tests • Present materials suitable to student's level of functioning • Include hands-on-activities 	
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 • Laboratory exercises related to subject matter • Chapter study guides • Oral presentation of chapter concepts 	

2009 NJCCCS

Standard: 5.1, 5.2

Strand(s): A, B, D - E

Content Statement(s):

CPI # / CPI(s): (2,3), (1,2,3), (2), (2)

[21st Century Themes](#)

X	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
<u>21st Century Skills</u>							
X	Creativity and Innovation	X	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: Laws of Conservation		Unit # 6 (CHAP 9)	
Course or Grade Level: PHYSICS		Length of Time: 1 week	
Pacing			
Essential Questions	<ul style="list-style-type: none"> • What happens to objects when they collide with other objects? 		
Content	<ul style="list-style-type: none"> • Measuring momentum • Impulse determination • Law of conservation of momentum 		
Skills	<ul style="list-style-type: none"> • Calculate the initial momentum of an object • Determine the change in momentum caused by an impulse • Determine initial / final momentum for a system • Use the Law of conservation of motion to determine behavior of objects in a collision 		
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Express measurements with appropriate labels • Mathematically convert measurements into desired units to correctly solve problems • Input data into calculators for solving problems • Interpreting graphs and diagrams 		
Assessments	<ul style="list-style-type: none"> • Teacher evaluation of special projects • Quizzes and chapter test • Homework assignments • Experiments/reports 		
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice for tests • Present materials suitable to student's level of functioning • Include hands-on-activities 		
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 • Laboratory exercises related to subject matter • Chapter study guides • Oral presentation of chapter concepts 		

2009 NJCCCS

Standard: 5.1, 5.2

Strand(s): A, B, D - E

Content Statement(s):	CPI # / CPI(s): (2,3), (1,2,3), (2), (2,3)

[21st Century Themes](#)

X	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
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[21st Century Skills](#)

X	Creativity and Innovation	X	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: Work, Energy and Simple Machines		Unit # 7 (CHAP 10, 11)	
Course or Grade Level: PHYSICS		Length of Time: 3 week	
Pacing			
Essential Questions	<ul style="list-style-type: none"> • What is energy and how is it used? 		
Content	<ul style="list-style-type: none"> • Potential and kinetic energy • Relationship between work and energy • Law of conservation of energy 		
Skills	<ul style="list-style-type: none"> • Calculate the initial energy of an object • Determine the change in energy for a system • Use the Law of conservation of energy to determine work and velocity of an object as the energy it has changes from potential to kinetic 		
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Express measurements with appropriate labels • Mathematically convert measurements into desired units to correctly solve problems • Input data into calculators for solving problems • Interpreting graphs and diagrams 		
Assessments	<ul style="list-style-type: none"> • Teacher evaluation of special projects • Quizzes and chapter test • Homework assignments • Experiments/reports 		
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice for tests • Present materials suitable to student's level of functioning • Include hands-on-activities 		
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 • Laboratory exercises related to subject matter • Chapter study guides • Oral presentation of chapter concepts 		

2009 NJCCCS

Standard: 5.1, 5.2

Strand(s): A, B, D - E

Content Statement(s):

CPI # / CPI(s): (2,3), (1,2,3), (2), (2,3)

21st Century Themes

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

X	Creativity and Innovation	X	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: Work, Energy and Simple Machines		Unit # 8 (CHAP 12)	
Course or Grade Level: PHYSICS		Length of Time: 1 week	
Pacing			
Essential Questions	<ul style="list-style-type: none"> • What is thermal energy, how is it measured and how is it used? 		
Content	<ul style="list-style-type: none"> • Measuring heat • Temperature scales • Law of Thermodynamics 		
Skills	<ul style="list-style-type: none"> • Calculate the amount of thermal energy in an object • Determine the change in heat content for an object as it transfers heat to another object • Apply the Laws of Thermodynamics 		
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Express measurements with appropriate labels • Mathematically convert measurements into desired units to correctly solve problems • Input data into calculators for solving problems • Interpreting graphs and diagrams 		
Assessments	<ul style="list-style-type: none"> • Teacher evaluation of special projects • Quizzes and chapter test • Homework assignments • Experiments/reports 		
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice for tests • Present materials suitable to student's level of functioning • Include hands-on-activities 		
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 • Laboratory exercises related to subject matter • Chapter study guides • Oral presentation of chapter concepts 		

2009 NJCCCS

Standard: 5.1, 5.2

Strand(s): A, B, D - E

Content Statement(s):	CPI # / CPI(s): (2,3), (1,2,3), (2), (2,3)

21st Century Themes

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

X	Creativity and Innovation	X	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: States of Matter		Unit # 9 (CHAP 13,14)	
Course or Grade Level: PHYSICS		Length of Time: 2 week	
Pacing			
Essential Questions	<ul style="list-style-type: none"> • What are the different states of matter and how do they change from one to another? 		
Content	<ul style="list-style-type: none"> • Gas Laws • Behavior of fluids • Characteristics of solids and how they react to changes in energy 		
Skills	<ul style="list-style-type: none"> • Calculate the changes in a gas as pressure, temperature and volume is manipulated • Describe the behavior of fluids from a static or fluid perspective • Calculate the changes a material undergoes when in the solid state as it experiences a change in energy 		
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Express measurements with appropriate labels • Mathematically convert measurements into desired units to correctly solve problems • Input data into calculators for solving problems • Interpreting graphs and diagrams 		
Assessments	<ul style="list-style-type: none"> • Teacher evaluation of special projects • Quizzes and chapter test • Homework assignments • Experiments/reports 		
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice for tests • Present materials suitable to student's level of functioning • Include hands-on-activities 		
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 • Laboratory exercises related to subject matter • Chapter study guides • Oral presentation of chapter concepts 		

2009 NJCCCS

Standard: 5.1, 5.2

Strand(s): A, B, D - E

Content Statement(s):	CPI # / CPI(s): (2,3), (1,2,3), (2), (2,3)

21st Century Themes

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

X	Creativity and Innovation	X	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: Wave Characteristics		Unit # 10 (CHAP 15)	
Course or Grade Level: PHYSICS		Length of Time: 2 week	
Pacing			
Essential Questions	<ul style="list-style-type: none"> • What are waves and how do they transmit energy? 		
Content	<ul style="list-style-type: none"> • Types of waves • Wave properties • Energy transfer in waves 		
Skills	<ul style="list-style-type: none"> • Calculate the characteristics of waves (energy, amplitude, wavelength and frequency) • Determine the change in wave behavior as it travels from one medium into another • Describe reflection, refraction and diffraction in waves 		
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Express measurements with appropriate labels • Mathematically convert measurements into desired units to correctly solve problems • Input data into calculators for solving problems • Interpreting graphs and diagrams 		
Assessments	<ul style="list-style-type: none"> • Teacher evaluation of special projects • Quizzes and chapter test • Homework assignments • Experiments/reports 		
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice for tests • Present materials suitable to student's level of functioning • Include hands-on-activities 		
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 • Laboratory exercises related to subject matter • Chapter study guides • Oral presentation of chapter concepts 		

2009 NJCCCS

Standard: 5.1, 5.2

Strand(s): A, B, D - E

Content Statement(s):	CPI # / CPI(s): (2,3), (1,2,3), (2), (2,3)

21st Century Themes

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

X	Creativity and Innovation	X	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: Wave Characteristics		Unit # 11 (CHAP 16, 17)
Course or Grade Level: PHYSICS		Length of Time: 2.5 week
Pacing		
Essential Questions	<ul style="list-style-type: none"> • What effect does the wave nature of energy have on the propagation of energy? • How does wave energy manifest as sound or color 	
Content	<ul style="list-style-type: none"> • Characteristics of transverse and longitudinal waves • Wave behavior when traveling into different media • Reflection and refraction of waves • Wave interference • Properties of sound waves • Doppler effect • Resonance of sound waves • Electromagnetic spectrum • Formation of color by primary light colors 	
Skills	<ul style="list-style-type: none"> • Calculate wave speed, wavelength or frequency • Demonstrate the principles of wave superposition • Calculate the distance to an object by using sound speed • Use the Doppler effect to determine the speed of a moving object • Use Doppler effect to determine the change in the speed of sound emanating from a moving object • Use the concept of resonance to determine the speed of sound • Explain how the different combination of primary light color results in the production of other colors 	
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Express measurements with appropriate labels • Mathematically convert measurements into desired units to correctly solve problems • Input data into calculators for solving problems • Interpreting graphs and diagrams 	
Assessments	<ul style="list-style-type: none"> • Teacher evaluation of special projects • Quizzes and chapter test • Homework assignments • Experiments/reports 	
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice for tests • Present materials suitable to student's level of functioning • Include hands-on-activities 	
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 • Laboratory exercises related to subject matter • Chapter study guides • Oral presentation of chapter concepts 	
2009 NJCCCS		
Standard: 5.1, 5.2		
Strand(s): A,B,D - E		
Content Statement(s):	CPI # / CPI(s): (2,3), (1,2,3), (2), (1,2,3,4)	

<u>21st Century Themes</u>							
X	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
<u>21st Century Skills</u>							
X	Creativity and Innovation	X	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: Mirrors and Lenses		Unit # 12 (CHAP 18)	
Course or Grade Level: PHYSICS		Length of Time: 2 week	
Pacing			
Essential Questions	<ul style="list-style-type: none"> • What happens when waves encounter barriers? • How do mirrors manipulate light waves? 		
Content	<ul style="list-style-type: none"> • Laws of reflection • Snell's Law • Concave and convex mirrors • Plane mirrors 		
Skills	<ul style="list-style-type: none"> • Determine the index of refraction using Snell's Law • Calculate the angle of reflection • Determine the critical angle of a substance • Calculate focal length, radius of curvature or distance to an image using the laws of reflection for mirrors • Use the Law of Mirrors to determine the location and orientation of an image 		
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Express measurements with appropriate labels • Mathematically convert measurements into desired units to correctly solve problems • Input data into calculators for solving problems • Interpreting graphs and diagrams 		
Assessments	<ul style="list-style-type: none"> • Teacher evaluation of special projects • Quizzes and chapter test • Homework assignments • Experiments/reports 		
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice for tests • Present materials suitable to student's level of functioning • Include hands-on-activities 		
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 • Laboratory exercises related to subject matter • Chapter study guides • Oral presentation of chapter concepts 		

2009 NJCCCS

Standard: 5.1, 5.2

Strand(s): A,B,D

Content Statement(s):

CPI # / CPI(s): (2,3), (1,2,3), (2)

21st Century Themes

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

X	Creativity and Innovation	X	Critical Thinking and Problem Solving		Communication and Collaboration		Information Literacy
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	Media Literacy		ICT Literacy		Life and Career Skills
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**Pine Hill Public Schools
Science Curriculum**

Unit Title: Reflection and refraction		Unit # 13 (CHAP 19)	
Course or Grade Level: PHYSICS		Length of Time: 1 week	
Pacing			
Essential Questions	<ul style="list-style-type: none"> • How do mirrors and lenses interact with wave energy? 		
Content	<ul style="list-style-type: none"> • Laws of reflection and refraction • Snell's Law • Images formed by mirrors and lenses • Magnification by mirrors and lenses 		
Skills	<ul style="list-style-type: none"> • Calculate bending of light by mirrors and lenses • Determine the type and location of an image formed by mirrors and lenses • Determine the refractive properties of mirrors and lenses 		
Math Skills/ Science Processes	<ul style="list-style-type: none"> • Express measurements with appropriate labels • Mathematically convert measurements into desired units to correctly solve problems • Input data into calculators for solving problems • Interpreting graphs and diagrams 		
Assessments	<ul style="list-style-type: none"> • Teacher evaluation of special projects • Quizzes and chapter test • Homework assignments • Experiments/reports 		
Interventions / differentiated instruction	<ul style="list-style-type: none"> • Provide advanced notice for tests • Present materials suitable to student's level of functioning • Include hands-on-activities 		
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 • Laboratory exercises related to subject matter • Chapter study guides • Oral presentation of chapter concepts 		

2009 NJCCCS

Standard: 5.1, 5.2

Strand(s): A, B, D - E

Content Statement(s):	CPI # / CPI(s): (2,3), (1,2,3), (2), (2,3)

21st Century Themes

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

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

