

## Pine Hill Public Schools Curriculum

Content Area:	<b>Special Areas</b>		
Course Title/ Grade Level:	Advanced Technology/ 10-12		
Unit 1:	Safety and Classroom Procedures	Month:	<b>September</b>
Unit 2:	Problem Solving and Brainstorming at Next Level	Month:	<b>September</b>
Unit 3:	Right Angle Geometry and the Transit	Month:	<b>September, October</b>
Unit 4:	Design and Construction of Fall Play	Month:	<b>October, November</b>
Unit 5:	Set Deconstruction	Month:	<b>November</b>
Unit 6:	Amusement Park Physics and Forces	Month:	<b>November, December</b>
Unit 7:	Advanced Technology Tech Challenge	Month:	<b>December</b>
Unit 8:	Lasers	Month:	<b>January</b>
Unit 9:	Transportation Systems	Month:	<b>January</b>
Unit 10:	Transportation Technology	Month:	<b>February</b>
Unit 11:	Design and Construction of Spring Musical	Month:	<b>February, March</b>
Unit 12:	Set Deconstruction	Month:	<b>March</b>
Unit 13:	Transportation Technology	Month:	<b>April</b>
Unit 14:	Transportation Technology	Month:	<b>May, June</b>
Unit 15:	Classroom Organization/Preparation	Month:	<b>June</b>
Date Created or Revised:	12.2012		
BOE Approval Date:	01.22.13		

**Pine Hill Public Schools**  
**Advanced Technology Curriculum**

<b>Unit Title:</b>	Review Safety and Classroom Procedures	<b>Unit #:</b>	<b>1</b>
<b>Course or Grade Level:</b>	<b>10-12</b>	<b>Length of Time:</b>	<b>1 week</b>
<b>Date Created:</b>	<b>Spring 2012</b>	<b>BOE Approval Date:</b>	
<b>Pacing</b>	weekly		
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• What is safety in and out of the classroom? How does safety affect the classroom environment?</li> <li>• Classroom procedures for a productive learning environment.</li> </ul>		
<b>Content</b>	<ul style="list-style-type: none"> <li>• Safety procedures, classroom management</li> <li>• Classroom procedures including beginning and ending of daily work sessions</li> </ul>		
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Review safety procedures that they learned in Technology I.</li> <li>• Explain proper class work procedures including gathering materials and tools, in class procedures, and clean up processes.</li> <li>• Prepare safe work environments in the classroom.</li> <li>• Clean up and store tools and materials at the end of each day.</li> </ul>		
<b>Assessments</b>	<ul style="list-style-type: none"> <li>• Safety quiz</li> <li>• Observation, summaries of work, tests, and quizzes</li> </ul>		
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Pictures and graphics to portray safety rules for needed students</li> <li>• Teacher led instruction and guidance to individuals who are unfamiliar with a particular tool.</li> </ul>		
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Computer animations and graphics</li> <li>• Web-based simulation programs</li> </ul>		
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Internet resources, classroom worksheets, safety worksheets, poster paper, computer</li> </ul>		

**2009 NJCCCS**

**Standard:** 9.4 Career/Tech Ed.

**Strand(s):** B. Architect/Construction

**Content Statement(s):** Career Cluster

**CPI # / CPI(s):** 9.4.12.B.(2)10

Safety Practice Procedure

**21<sup>st</sup> Century Themes**

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

**21<sup>st</sup> 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**  
**Advanced Technology Curriculum**

<b>Unit Title:</b> Problem Solving and Brainstorming at Next Level		<b>Unit #: 2</b>
<b>Course or Grade Level:</b> 10-12		<b>Length of Time:</b> 2 weeks
<b>Date Created:</b> Spring 2012		<b>BOE Approval Date:</b>
<b>Pacing</b>	weekly	
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• What can we learn from last year's projects to improve this year's class?</li> <li>• Why is documentation critically important in any and all aspects of technology?</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>• Brainstorming solutions to problems</li> <li>• Problem solve issues to solutions to projects</li> </ul>	
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Design complex machine to propel a paper football.</li> <li>• Use all available hand and power tools to complete project.</li> <li>• Storing of projects and materials.</li> </ul>	
<b>Assessments</b>	<ul style="list-style-type: none"> <li>• Tool practice usage</li> <li>• Accuracy of football kicking machine</li> <li>• Observation of proper tool usage and work habits.</li> <li>• Summaries of work, tests, and quizzes</li> </ul>	
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Teacher led instruction and guidance to individuals who are unfamiliar with a particular tool.</li> <li>• Peer help from experienced students to assist students in tool usage.</li> <li>• Trial and error without any repercussion of mistakes or failure. Learn through failure to make changes in project as you would in any real world problem.</li> </ul>	
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Mathematical calculations such as addition, fractional equivalents, distances, etc.</li> <li>• Physics- potential and kinetic energy applications to project.</li> </ul>	
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Football kicking machine</li> <li>• Internet resources, classroom worksheets, computer</li> <li>• Tools and sketching</li> </ul>	

**2009 NJCCCS**

**Standard:** 9.4 Career/Tech Ed.

**Strand(s):** M. Manufacturing, B. Architect/Construction, O. STEM

**Content Statement(s):** Safety Health, Career Cluster, Technical Skills, Problem Solving/Critical Thinking

**CPI # / CPI(s):** 9.4.12.M.(6)7, 9.4.12.B.(1)8, 9.4.12.B.(2)17, 9.4.12.O.17, 9.4.12.O.(1)11

Safe Use of Equipment, Data Collection, Use Skills on Project, Problem Solving/ Individual & Team, Design Process

**21<sup>st</sup> Century Themes**

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

**21<sup>st</sup> 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**  
**Advanced Technology Curriculum**

<b>Unit Title:</b> Right Angle Geometry and the Transit		<b>Unit #: 3</b>	
<b>Course or Grade Level:</b> 10-12		<b>Length of Time:</b> 2 weeks	
<b>Date Created:</b> Spring 2012		<b>BOE Approval Date:</b>	
<b>Pacing</b>	weekly		
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• What is right triangle geometry and where do we see it in engineering?</li> <li>• What is a transit, how do you set up and use one, and what careers might use this type of engineering tool?</li> </ul>		
<b>Content</b>	<ul style="list-style-type: none"> <li>• Reviewing right triangle geometric applications</li> <li>• Setting up and shooting a transit outside to see real world applications.</li> </ul>		
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Set up and shoot various elevations and angular measurements.</li> <li>• Problem solve right triangle problems to engineering problems</li> </ul>		
<b>Assessments</b>	<ul style="list-style-type: none"> <li>• Transit set up and use.</li> <li>• Accuracy of elevations shooting transit.</li> <li>• Observation of proper tool usage and work habits.</li> <li>• Creating geometric projections using right triangle geometry calculations.</li> </ul>		
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Teacher led instruction and guidance to individuals who are unfamiliar with a particular tool.</li> <li>• Peer help from experienced students to assist students in tool usage.</li> <li>• Hands on examples and building of calculated geometry to show how the math can be used daily.</li> </ul>		
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Mathematical calculations in right triangle geometry.</li> <li>• Careers- using a transit in a career and different occupations that use transit.</li> </ul>		
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Shooting transit for elevations, right triangle geometry</li> <li>• Internet resources, classroom worksheets, computer</li> <li>• Data collection of elevations, tools</li> </ul>		
<b>2009 NJCCCS</b>			
<b>Standard:</b> 9.4 Career/Tech Ed.			
<b>Strand(s):</b> M. Manufacturing, B. Architect/Construction, O. STEM			
<b>Content Statement(s):</b> Safety Health, Career Cluster, Technical Skills, Academic Foundation		<b>CPI # / CPI(s):</b> 9.4.12.M.(6)7, 9.4.12.B.(1)8, 9.4.12.B.(2)17, 9.4.12.0.(2).2, 9.4.12.0.(1)2	
		Safe Use of Equipment, Data Collection, Use Skills on Project, Apply Science Math to Project, Geometry, Algebra, Trigonometry	
<b><u>21<sup>st</sup> Century Themes</u></b>			
Global Awareness	Financial, Economic, Business, and Entrepreneurial Literacy	Civic Literacy	Health Literacy
<b><u>21<sup>st</sup> Century Skills</u></b>			
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  
Advanced Technology Curriculum**

<b>Unit Title:</b> Design and Construction of Fall Play		<b>Unit #:</b> 4
<b>Course or Grade Level:</b> 10-12		<b>Length of Time:</b> 5 weeks
<b>Date Created:</b> Spring 2012		<b>BOE Approval Date:</b>
<b>Pacing</b>	weekly	
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• What type of play is it?</li> <li>• Do the different scenes need moveable or stationary wagons?</li> <li>• Can we make the stage/setting safe yet pleasing to the audience's eye?</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>• Construction and layout skills for set design and construction.</li> <li>• Keeping the theme of fall play consistent in the design and appearance of set.</li> </ul>	
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Build various frames, wagons, and vertical assemblies to represent different scenes within the play.</li> <li>• Sketching ideas, explaining ideas to classmates on how to accomplish the build.</li> <li>• Collaborate with peers as best way to construct set.</li> <li>• Drill, cut, and attach various components for set design.</li> </ul>	
<b>Assessments</b>	<ul style="list-style-type: none"> <li>• Set design and construction</li> <li>• Sketching ideas before constructing projects</li> <li>• Observation, working with others.</li> </ul>	
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Have inhibited students work with more competent and confident ones to increase their self-esteem and create a sense of pride and ownership of building something on such a grand scale.</li> <li>• Create student leaders to govern small groups of students working on set.</li> </ul>	
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Mathematical calculations such as addition, fractional equivalents, distances, etc.</li> <li>• Art- sketching ideas</li> <li>• Communication- being able to communicate ideas and thoughts on how to build set.</li> </ul>	
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Set design and construction</li> <li>• Drawings and plans</li> <li>• Sketches, tools</li> </ul>	

**2009 NJCCCS**

**Standard:** 9.4 Career/Tech Ed.

**Strand(s):** O. STEM, B. Architect/Construction

**Content Statement(s):** Problem Solving/Critical Thinking, Leadership/Teamwork, Technical Skills

**CPI # / CPI(s):** 9.4.12.0.17, 9.4.12.0.48, 9.4.12.B.(3)3, 9.4.12.0.(1)11

Problem Solving/ Individual & Team, Teamwork Skills, Construction Skills, Design Process

**21<sup>st</sup> Century Themes**

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

**21<sup>st</sup> 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  
Advanced Technology Curriculum**

<b>Unit Title:</b> Set Deconstruction		<b>Unit #: 5</b>
<b>Course or Grade Level:</b> 9-12		<b>Length of Time:</b> 1 week
<b>Date Created:</b> Spring 2012		<b>BOE Approval Date:</b>
<b>Pacing</b>	weekly	
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• How can we break down and store play components safely?</li> <li>• What components can we use for the spring musical?</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>• Construction skills to deconstruct set.</li> <li>• Safety and teamwork when moving and storing large pieces.</li> </ul>	
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Remove components to reuse in future play.</li> <li>• Safely work together to store neatly.</li> </ul>	
<b>Assessments</b>	<ul style="list-style-type: none"> <li>• Set deconstruction work</li> <li>• Observation</li> </ul>	
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Heterogeneous grouping for additional.</li> <li>• Have one or more students act as leaders of group, directing movement and storage of pieces. Creates a sense of ownership for students to be given responsibilities.</li> </ul>	
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Health- working safely with heavy objects, properly picking up as to not injure self and others.</li> </ul>	
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Set design and deconstruction</li> <li>• Tools</li> </ul>	

**2009 NJCCCS**

**Standard:** 9.4 Career/Tech Ed.

**Strand(s):** O. STEM, B. Architect/Construction

<b>Content Statement(s):</b> Problem Solving/Critical Thinking, Leadership/Teamwork, Technical Skills	<b>CPI # / CPI(s):</b> 9.4.12.0.17, 9.4.12.0.48, 9.4.12.B.(3)3, 9.4.12.0.(1)11
---	--

Problem Solving/ Individual & Team, Teamwork Skills, Construction Skills, Design Process
--

**21<sup>st</sup> Century Themes**

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

**21<sup>st</sup> 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  
Advanced Technology Curriculum**

<b>Unit Title:</b> Amusement Park Physics and Forces		<b>Unit #: 6</b>
<b>Course or Grade Level:</b> 9-12		<b>Length of Time:</b> 2.5 weeks
<b>Date Created:</b> Spring 2012		<b>BOE Approval Date:</b>
<b>Pacing</b>	weekly	
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• What forces do you encounter in riding many of the amusement rides today?</li> <li>• How do these forces affect the rider and where are they encountered?</li> <li>• How can a ride engineer manipulate these forces to make a better amusement ride?</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>• Physics of roller coasters and other amusement park rides.</li> <li>• Understand how the forces affect the “fun factor” of amusement park rides.</li> <li>• Apply knowledge of forces in a scale model application.</li> </ul>	
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Sketch idea of roller coaster showing where the physics terms will apply (i.e., gravity, centrifugal force, etc.)</li> <li>• Design and build a scale model roller coaster using vinyl tubing, copper bb, and other materials.</li> <li>• Test bb roller coaster by measuring distance bb travels after exiting tubing.</li> </ul>	
<b>Assessments</b>	<ul style="list-style-type: none"> <li>• BB roller coaster</li> <li>• Observation</li> <li>• Worksheets, summaries, and sketches</li> </ul>	
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Collaborative learning groups chosen by students to achieve better quality of work because they will be comfortable with whom they are working.</li> </ul>	
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Engineering- use basic engineering principles to complete Tech Challenges.</li> </ul>	
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Internet, roller coaster simulation programs</li> <li>• Research activities</li> <li>• Tools</li> </ul>	

**2009 NJCCCS**

**Standard:** 9.4 Career/Tech Ed.

**Strand(s):** M. Manufacturing, B. Architect/Construction, O. STEM

**Content Statement(s):** Safety Health, Career Cluster, Information Technology, Academic Foundation, Technical Skills

**CPI # / CPI(s):** 9.4.12.M.(6)7, 9.4.12.B.(1)3, 9.4.12.0.30, 9.4.12.0.(1)4, 9.4.12.0.(1)11

Safe Use of Equipment, Structural Building, Use Computer Applications, Newton's Laws of Physics, Design Process

**21<sup>st</sup> Century Themes**

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

**21<sup>st</sup> 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**  
**Advanced Technology Curriculum**

<b>Unit Title:</b> Advanced Technology Tech Challenge		<b>Unit #: 7</b>
<b>Course or Grade Level:</b> 9-12		<b>Length of Time:</b> 1.5 weeks
<b>Date Created:</b> Spring 2012		<b>BOE Approval Date:</b>
<b>Pacing</b>	weekly	
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• What are various ways to get movement?</li> <li>• How can gears and cams create movement?</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>• Different types of movement including cams, gears, rack and pinion, and levers.</li> <li>• Simple and complex machines.</li> </ul>	
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Use brainstorming skills to come up with several possible solutions to Tech Challenge.</li> <li>• Combine both simple and complex machines in confined space to create movement.</li> <li>• Work individually to complete assigned tasks.</li> </ul>	
<b>Assessments</b>	<ul style="list-style-type: none"> <li>• Tech Challenge TLA</li> <li>• Observation</li> <li>• Summaries of work, tests, and quizzes</li> </ul>	
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Advanced students can assist students in brainstorming and researching solutions</li> <li>• Allowing students to work with a partner if challenge is too difficult.</li> </ul>	
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Engineering- making simple and complex machines work together to accomplish challenge.</li> <li>• Art- design that follows form follows function mantra.</li> </ul>	
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Tech Challenge TLA</li> <li>• Research on internet about complex machines.</li> <li>• Tools</li> </ul>	

**2009 NJCCCS**

**Standard:** 9.4 Career/Tech Ed.

**Strand(s):** B. Architect/Construction, B. Architect/Construction, **O. STEM, M. Manufacturing**

**Content Statement(s):** Career Cluster, Technical Skills, Academic Foundation, Academic Foundation

**CPI # / CPI(s): 9.4.12.B.(1)3, 9.4.12.B.(2)16, 9.4.12.0.2, 9.4.12.M.(6)7,**

Structural Building, Building Systems, Math Knowledge, Safe Use of Equipment

[21<sup>st</sup> Century Themes](#)

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

[21<sup>st</sup> 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  
Advanced Technology Curriculum**

<b>Unit Title:</b>	Lasers and Laser Properties	<b>Unit #:</b>	8
<b>Course or Grade Level:</b>	9-12	<b>Length of Time:</b>	2 weeks
<b>Date Created:</b>	Spring 2012	<b>BOE Approval Date:</b>	
<b>Pacing</b>	weeks		
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• What does the acronym LASER mean?</li> <li>• How do lasers work and where are they used in today's society?</li> <li>• What types of careers use lasers and how?</li> </ul>		
<b>Content</b>	<ul style="list-style-type: none"> <li>• LASER- light amplification stimulated emitted radiation</li> <li>• Properties of laser light.</li> <li>• Angles of Incidence, Angle of Reflection, Normal Line</li> </ul>		
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Build a laser reflecting device that will reflect the laser light several times to hit a target.</li> <li>• Determine the proper angles of incidence and reflection to accomplish task.</li> <li>• Bisect angles to produce a known distance and angle.</li> <li>• Use laser light to predict distances and angles using Trigonometry.</li> </ul>		
<b>Assessments</b>	<ul style="list-style-type: none"> <li>• Laser Light TLA</li> <li>• Worksheets, summaries of work, tests, and quizzes</li> <li>• Observation</li> </ul>		
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Advanced students can assist students in brainstorming and researching solutions</li> <li>• Allowing students to work with a partner if challenge is too difficult.</li> </ul>		
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Engineering- making simple and complex machines work together to accomplish challenge.</li> <li>• Art- design that follows form follows function mantra.</li> </ul>		
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Tech Challenge TLA</li> <li>• Research on internet about complex machines.</li> <li>• Laser levels, internet resources, protractors</li> </ul>		

**2009 NJCCCS**

**Standard:** 9.4 Career/Tech Ed.

**Strand(s):** B. Architect/Construction, B. Architect/Construction, O. STEM, M. Manufacturing

**Content Statement(s):** Career Cluster, Technical Skills, Academic Foundation, Academic Foundation

**CPI # / CPI(s):** 9.4.12.B.(1)3, 9.4.12.B.(2)16, 9.4.12.0.2, 9.4.12.M.(6)7,

Structural Building, Building Systems, Math Knowledge, Safe Use of Equipment

**21<sup>st</sup> Century Themes**

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

**21<sup>st</sup> 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  
Advanced Technology Curriculum**

<b>Unit Title:</b> Transportation Systems		<b>Unit #: 9</b>
<b>Course or Grade Level:</b> 10-12		<b>Length of Time:</b> 2 weeks
<b>Date Created:</b> Spring 2012		<b>BOE Approval Date:</b>
<b>Pacing</b>	weekly	
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• How are loads delivered in a precise and uniformed manner?</li> <li>• What forces do you have to overcome to safely move item?</li> <li>• How does the design of the vehicle affect the delivery of its payload?</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>• Physics of load placement and delivery of such load safely.</li> <li>• Braking systems and guidance systems.</li> </ul>	
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Build load delivery system that safely puts load in predetermined area.</li> <li>• Add braking system if needed to slow down vehicle for safety reasons.</li> <li>• Create unique delivery method without compromising vehicle design.</li> </ul>	
<b>Assessments</b>	<ul style="list-style-type: none"> <li>• Vehicle Delivery TLA</li> <li>• Observation</li> </ul>	
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Research and review of braking systems using Internet search.</li> <li>• Trial and error to determined best design.</li> </ul>	
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Engineering-construction delivery vehicle</li> <li>• Art- form follows function of vehicle</li> <li>• Math- lowering impact of force upon vehicle and load it is distributing.</li> </ul>	
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Internet, videos</li> <li>• Wheels, axles, various materials in shop</li> </ul>	

**2009 NJCCCS**

**Standard:** 9.4 Career/Tech Ed.

**Strand(s):** B. Architect/Construction, M. Manufacturing, O. STEM

**Content Statement(s):** Career Cluster, Safety Health, Academic Foundation

**CPI # / CPI(s):** 9.4.12.B.(1)11, 9.4.12.M.(6)7,9.4.12.O.(1)4

Construction Principle, Safe Use of Equipment, Newton's Laws of Physics

[21<sup>st</sup> Century Themes](#)

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

[21<sup>st</sup> 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**  
**Advanced Technology Curriculum**

<b>Unit Title:</b> Transportation Technology		<b>Unit #: 10</b>
<b>Course or Grade Level:</b> 10-12		<b>Length of Time:</b> 2 weeks
<b>Date Created:</b> Spring 2012		<b>BOE Approval Date:</b>
<b>Pacing</b>	weekly	
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• What are some of the new emerging transportation technologies?</li> <li>• Are these new transportation technologies economically feasible?</li> <li>• Is the United States moving towards better transportation technologies and are they important for the future of transportation in the United States and the World?</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>• Magnetic levitation technology</li> <li>• Roller coaster and transportation using magnetic levitation technology</li> <li>• Polarity and properties of electromagnetism</li> </ul>	
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Designing and constructing floating magnetic levitation vehicle</li> <li>• Creating balance to improve speed and efficiency of vehicle</li> <li>• Providing propulsion system to move along predetermined length of maglev track</li> </ul>	
<b>Assessments</b>	<ul style="list-style-type: none"> <li>• Maglev Vehicle TLA</li> <li>• Observation</li> </ul>	
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Visual aids identifying various components of transit.</li> <li>• Sketching of construction ideas rather than written suggestions. Sometimes students can present their ideas more easily with a picture rather than a paragraph.</li> </ul>	
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Theatre- set design and the inner workings of a play.</li> <li>• Art- design to make audience feel as if they are really in the experience.</li> </ul>	
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Internet, videos</li> <li>• Communication activities</li> <li>• Transit, levels, story poles, tools</li> </ul>	

**2009 NJCCCS**

**Standard:** 9.4 Career/Tech Ed.

**Strand(s):** O. STEM, M. Manufacturing,

**Content Statement(s):** Information Technology, Academic Foundation

**CPI # / CPI(s):** 9.4.12.0.(1)8, 9.4.12.M.(6)7

Use Communication Technology, Safe Use of Equipment

**21<sup>st</sup> Century Themes**

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

**21<sup>st</sup> 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  
Advanced Technology Curriculum**

<b>Unit Title:</b> Design and Construction of Spring Musical		<b>Unit #:</b> 11
<b>Course or Grade Level:</b> 10-12		<b>Length of Time:</b> 5 weeks
<b>Date Created:</b> Spring 2012		<b>BOE Approval Date:</b>
<b>Pacing</b>	weekly	
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• What type of play is it?</li> <li>• Do the different scenes need moveable or stationary wagons?</li> <li>• Can we make the stage/setting safe yet pleasing to the audience's eye?</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>• Construction and layout skills for set design and construction.</li> <li>• Keeping the theme of fall play consistent in the design and appearance of set.</li> </ul>	
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Build various frames, wagons, and vertical assemblies to represent different scenes within the play.</li> <li>• Sketching ideas, explaining ideas to classmates on how to accomplish the build.</li> <li>• Collaborate with peers as best way to construct set.</li> <li>• Drill, cut, and attach various components for set design.</li> </ul>	
<b>Assessments</b>	<ul style="list-style-type: none"> <li>• Set design and construction</li> <li>• Sketching ideas before constructing projects</li> <li>• Observation, working with others.</li> </ul>	
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Have inhibited students work with more competent and confident ones to increase their self-esteem and create a sense of pride and ownership of building something on such a grand scale.</li> <li>• Create student leaders to govern small groups of students working on set.</li> </ul>	
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Mathematical calculations such as addition, fractional equivalents, distances, etc.</li> <li>• Art- sketching ideas</li> <li>• Communication- being able to communicate ideas and thoughts on how to build set.</li> </ul>	
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Set design and construction</li> <li>• Drawings and plans</li> <li>• Sketches, tools</li> </ul>	

**2009 NJCCCS**

**Standard:** 9.4 Career/Tech Ed.

**Strand(s):** O. STEM, B. Architect/Construction

**Content Statement(s):** Problem Solving/Critical Thinking, Leadership/Teamwork, Technical Skills

**CPI # / CPI(s):** 9.4.12.0.17, 9.4.12.0.48, 9.4.12.B.(3)3, 9.4.12.0.(1)11

Problem Solving/ Individual & Team, Teamwork Skills, Construction Skills, Design Process

**21<sup>st</sup> Century Themes**

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

**21<sup>st</sup> 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  
Advanced Technology Curriculum**

<b>Unit Title:</b> Set Deconstruction		<b>Unit #: 12</b>
<b>Course or Grade Level:</b> 9-12		<b>Length of Time:</b> 1 week
<b>Date Created:</b> Spring 2012		<b>BOE Approval Date:</b>
<b>Pacing</b>	weekly	
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• How can we break down and store play components safely?</li> <li>• What components can we use for the spring musical?</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>• Construction skills to deconstruct set.</li> <li>• Safety and teamwork when moving and storing large pieces.</li> </ul>	
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Remove components to reuse in future play.</li> <li>• Safely work together to store neatly.</li> </ul>	
<b>Assessments</b>	<ul style="list-style-type: none"> <li>• Set deconstruction work</li> <li>• Observation</li> </ul>	
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Heterogeneous grouping for additional work.</li> <li>• Have one or more students act as leaders of group, directing movement and storage of pieces. Creates a sense of ownership for students to be given responsibilities.</li> </ul>	
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Health- working safely with heavy objects, properly picking up as to not injure self and others.</li> </ul>	
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Set design and deconstruction</li> <li>• Tools</li> </ul>	

**2009 NJCCCS**

**Standard:** 9.4 Career/Tech Ed.

**Strand(s):** O. STEM, B. Architect/Construction

<b>Content Statement(s):</b> Problem Solving/Critical Thinking, Leadership/Teamwork, Technical Skills	<b>CPI # / CPI(s):</b> 9.4.12.0.17, 9.4.12.0.48, 9.4.12.B.(3)3, 9.4.12.0.(1)11
---	--

Problem Solving/ Individual & Team, Teamwork Skills, Construction Skills, Design Process
--

**21<sup>st</sup> Century Themes**

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

**21<sup>st</sup> 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**  
**Advanced Technology Curriculum**

<b>Unit Title:</b> Transportation Technology		<b>Unit #:</b> 13
<b>Course or Grade Level:</b> 9-12		<b>Length of Time:</b> 4 weeks
<b>Date Created:</b> Spring 2012		<b>BOE Approval Date:</b>
<b>Pacing</b>	weekly	
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• How does design affect speed in automobiles?</li> <li>• How do these forces affect the performance of automobiles?</li> <li>• What attributes exist in race cars that are not necessarily needed in family automobiles?</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>• Designs, air resistance, and shape are discussed as they pertain to form and function of CO2 race cars.</li> <li>• Pushing designs of automobiles to challenge perceptions of race cars.</li> <li>• Overcoming friction and air resistance in race car design.</li> </ul>	
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Sketch idea of CO2 race cars</li> <li>• Design and build a balsa wood CO2 car</li> <li>• Painting and woodworking skills needed to make CO2 car aerodynamic</li> </ul>	
<b>Assessments</b>	<ul style="list-style-type: none"> <li>• CO2 race car TLA</li> <li>• Observation</li> <li>• Worksheets, summaries, calculated speed, and sketches</li> </ul>	
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Have students push the boundaries of design thinking that someday they may have an idea that other people believe is bad but turns out to be great. No limits on designs.</li> <li>• Create interesting name for CO2 car to be marketed to the masses. Students can research existing names of cars to see what they mean and if the name can sell more cars.</li> </ul>	
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Art- Design elements incorporated into car design</li> <li>• Engineering- principles of aerodynamics</li> <li>• Marketing- naming car to stand out in marketplace of hundreds of other cars</li> </ul>	
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Internet, automobile websites</li> <li>• Research activities</li> <li>• Tools</li> </ul>	

**2009 NJCCCS**

**Standard:** 9.4 Career/Tech Ed.

**Strand(s):** M. Manufacturing, B. Architect/Construction, O. STEM

**Content Statement(s):** Safety Health, Career Cluster, Information Technology, Academic Foundation, Technical Skills

**CPI # / CPI(s):** 9.4.12.M.(6)7, 9.4.12.B.(1)9, 9.4.12.0.30, 9.4.12.0.(1)5, 9.4.12.0.(1)11

Safe Use of Equipment, CAD Drafting Plans, Use Computer Applications, Physical Properties of Materials, Design Process

**21<sup>st</sup> Century Themes**

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

**21<sup>st</sup> 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  
Advanced Technology Curriculum**

<b>Unit Title:</b> Transportation Technology		<b>Unit #: 14</b>
<b>Course or Grade Level:</b> 9-12		<b>Length of Time:</b> 4 weeks
<b>Date Created:</b> Spring 2012		<b>BOE Approval Date:</b>
<b>Pacing</b>	weekly	
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• What is Bernoulli's Principle and how did this principle change scientists' ideas on movement and flight?</li> <li>• What are the forces that affect flight?</li> <li>• How is an airfoil shaped in order to create lift?</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>• Lift, Drag, Acceleration, Thrust</li> <li>• Airfoil design</li> </ul>	
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Create an airfoil and attach to fuselage to create airplane capable of flight.</li> <li>• Sketch ideas of new type of plane or use existing designs.</li> <li>• Work individually to complete assigned tasks.</li> </ul>	
<b>Assessments</b>	<ul style="list-style-type: none"> <li>• Airfoil/airplane TLA</li> <li>• Observation</li> <li>• Summaries of work, sketches, and quizzes</li> </ul>	
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Advanced students can assist students in design of airfoil.</li> <li>• Allowing students to work with a partner if challenge is too difficult.</li> </ul>	
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Engineering- applying Bernoulli's Principle to airfoil design</li> <li>• History- researching plane designs and using as an example for which to construct.</li> </ul>	
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Airfoil/airplane TLA</li> <li>• Research on internet about airplanes and airfoils.</li> <li>• Tools</li> </ul>	

**2009 NJCCCS**

**Standard:** 9.4 Career/Tech Ed.

**Strand(s):** B. Architect/Construction, B. Architect/Construction, **O. STEM, M. Manufacturing**

**Content Statement(s):** Career Cluster, Technical Skills, Academic Foundation, Academic Foundation

**CPI # / CPI(s):** 9.4.12.B.(1)3, 9.4.12.B.(1)9, 9.4.12.0.2, 9.4.12.M.(6)7, 9.4.12.O.(1)2

Structural Building, CAD Drafting Plans, Math Knowledge, Safe Use of Equipment, Apply Science Math to Project

**21<sup>st</sup> Century Themes**

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

**21<sup>st</sup> 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  
Advanced Technology Curriculum**

<b>Unit Title:</b> Classroom Organization/Preparation		<b>Unit #: 15</b>	
<b>Course or Grade Level:</b> 10-12		<b>Length of Time:</b> 1 weeks	
<b>Date Created:</b> Spring 2012		<b>BOE Approval Date:</b>	
<b>Pacing</b>	weekly		
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• Why is a clean and organized shop essential to better learning?</li> <li>• What types of projects should be refined for next year's students?</li> <li>• What materials would have made the projects better this past year?</li> </ul>		
<b>Content</b>	<ul style="list-style-type: none"> <li>• Group discussion on past projects to make better projects next year</li> <li>• Material selection that is based on existing budgetary constricts</li> </ul>		
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Organizing materials for safer access</li> <li>• Removing materials safely for disposal, recycling when necessary</li> </ul>		
<b>Assessments</b>	<ul style="list-style-type: none"> <li>• Work on organization</li> <li>• Observation</li> </ul>		
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Collaborative learning to induce meaningful discussion about projects</li> <li>• Have students organize themselves into working groups and let them decide who will be leader.</li> </ul>		
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• English- group discussion</li> <li>• Health- safety considerations when storing and stacking materials for next year</li> </ul>		
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Communication activities</li> <li>• Tools</li> </ul>		
<b>2009 NJCCCS</b>			
<b>Standard:</b> 9.4 Career/Tech Ed.			
<b>Strand(s):</b> B. Architect/Construction , M. Manufacturing,			
<b>Content Statement(s):</b> Career Cluster, Safety Health		<b>CPI # / CPI(s): 9.4.12.B.(1)1, 9.4.12.M.(6)7</b>	
		Communication Skills, Safe Use of Equipment	
<b><u>21<sup>st</sup> Century Themes</u></b>			
Global Awareness	Financial, Economic, Business, and Entrepreneurial Literacy	Civic Literacy	Health Literacy
<b><u>21<sup>st</sup> Century Skills</u></b>			
Creativity and Innovation	Critical Thinking and Problem Solving	Communication and Collaboration	Information Literacy
Media Literacy	ICT Literacy	Life and Career Skills	