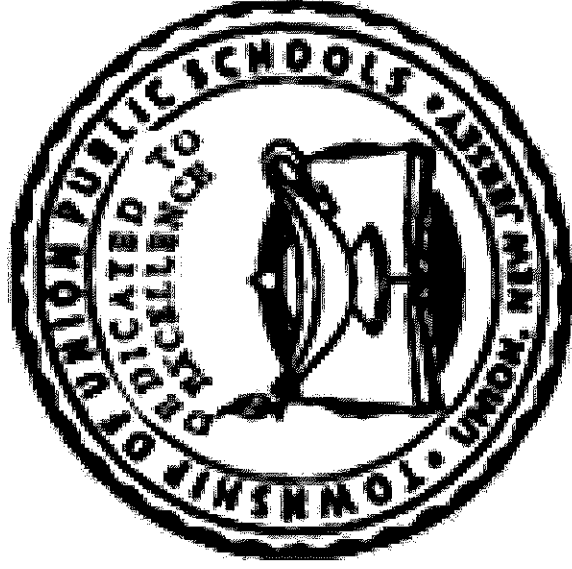


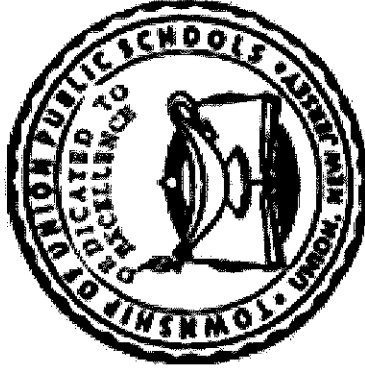
TOWNSHIP OF UNION PUBLIC SCHOOLS



**Technology Education
TE 200**

Curriculum Guide

Curriculum Guide Approved June 2015



Board Members

David Arminio, President

Vito Nufrio, Vice President

Guy Francis

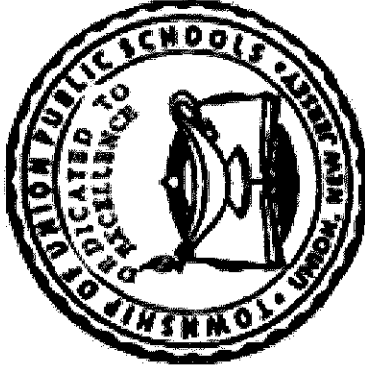
Richard Galante

Lois Jackson

Ronald McDowell

Angel Salcedo

Nancy Zuena



TOWNSHIP OF UNION PUBLIC SCHOOLS

Administration

SuperintendentMr. Gregory Tatum

Assistant SuperintendentDr. Noreen Lishak

Director of Student Information/TechnologyMs. Ann M. Hart

Director of Athletics, Health, Physical Education and Nurses.....Ms. Linda Ionta

DEPARTMENT SUPERVISORS

All Academic Areas K-2	Ms. Maureen Corbett
Language Arts/Social Studies 3-5	Mr. Robert Ghiretti
Mathematics/Science 3-5	Ms. Theresa Matthews
Guidance K-12/SAC	Ms. Nicole Ahern
Language Arts.....	Ms. Mary Malyska
Math 8-12.....	Mr. Jason Mauriello
Science 6-12.....	Ms. Maureen Guilfoyle
Social Studies/Business.....	Ms. Libby Galante
World Language/ESL/Career Education/G&T/Computer Technology.....	Ms. Yvonne Lorenzo
Art/Music	Mr. Ronald Rago

**Technology Education
TE 200**

Curriculum Committee Members

Edwin Oyola

Daniel Eberenz

Table of Contents

Title Page	
Board Members	
Administration	
Department Supervisors	
Curriculum Committee	
Table of Content	
District Mission/Philosophy Statement	
District Goals	
Course Description	
Recommended Texts	
Course Proficiencies	
Curriculum Units	
Appendix: New Jersey Core Curriculum Content Standards	

Mission Statement

The Township of Union Board of Education believes that every child is entitled to an education designed to meet his or her individual needs in an environment that is conducive to learning. State standards, federal and state mandates, and local goals and objectives, along with community input, must be reviewed and evaluated on a regular basis to ensure that an atmosphere of learning is both encouraged and implemented. Furthermore, any disruption to or interference with a healthy and safe educational environment must be addressed, corrected, or when necessary, removed in order for the district to maintain the appropriate educational setting.

Philosophy Statement

The Township of Union Public School District, as a societal agency, reflects democratic ideals and concepts through its educational practices. It is the belief of the Board of Education that a primary function of the Township of Union Public School System is to formulate a learning climate conducive to the needs of all students in general, providing therein for individual differences. The school operates as a partner with the home and community.

Statement of District Goals

- **Develop reading, writing, speaking, listening, and mathematical skills.**
- **Develop a pride in work and a feeling of self-worth, self-reliance, and self-discipline.**
- **Acquire and use the skills and habits involved in critical and constructive thinking.**
- **Develop a code of behavior based on moral and ethical principles.**
- **Work with others cooperatively.**
- **Acquire a knowledge and appreciation of the historical record of human achievement and failures and current societal issues.**
- **Acquire a knowledge and understanding of the physical and biological sciences.**
- **Participate effectively and efficiently in economic life and the development of skills to enter a specific field of work.**
- **Appreciate and understand literature, art, music, and other cultural activities.**
- **Develop an understanding of the historical and cultural heritage.**
- **Develop a concern for the proper use and/or preservation of natural resources.**
- **Develop basic skills in sports and other forms of recreation**

Course Description

TECHNOLOGY EDUCATION TE 200
(Prerequisites): TE 100

Enrollment: Grades 10-12

Purpose and Overview

Technology Education II will utilize a problem solving approach to design. Students will be exposed to hands on Technology Learning Activities (TLA) to investigate areas listed below. In exploring technology students develop an understanding of the progression and scope of technology through exploratory experiences. In group and individual activities, students experience ways in which technological knowledge and processes contribute to effective designs, abilities, and skills contribute to effective design and solutions to technological problems. Students participate in design activities to understand how criteria, constraints, and processes affect designs. Brainstorming, visualizing, modeling, constructing, testing, and refining designs provide firsthand opportunities for students to understand the uses and impacts of innovations. Areas of concentration include: The Design Process, Communications, Materials and Characteristics, Technology Systems, Structures, Construction Systems, Simple Machines, Transportation, Energy, Electricity and Magnetism, Vocational Areas and the impacts of Technology on society.

Recommended Textbooks

TECHNOLOGY Shaping Our World -

John Gradwell, Malcolm Welch Eugene Martin, The
Goodheart-Wilcox Co. Inc.
Tinley Park Illinois. 1996 Edition

TECHNOLOGY Today and Tomorrow

Sharon Brusic, James Fale and Vincent Kuetemeyer
Glencoe, McGraw-Hill Publishing Company
New York 1999 Edition

TECHNOLOGY Today and Tomorrow

Sharon Brusic, James Fale and Vincent Kuetemeyer **STUDENT WORKBOOK**
Glencoe, McGraw-Hill Publishing Company
New York 1999 Edition

Course Proficiencies

Students will be able to...

TECH ED II

At the completion of TECH ED II the student should have a basic knowledge of and demonstrated:

1. An understanding of technology and its effect on society.
2. Understand the definition of technology
3. An understanding of the problem solving method (design loop)
4. Understand a technological system
5. Understand the seven resources of technology
6. An understanding of measurements and appropriate math skills
7. A basic knowledge of computers software and it's applications
8. An understanding of basic design procedures to produce quality drawings
9. The ability to construct prototype models of project ideas
10. Understand the concept of craftsmanship to produce quality prototype models
11. The proper care for the computers, peripherals and equipment
12. Appropriate classroom rules and regulations

Curriculum Units

Unit 1: [Introduction to TECH ED II](#)

Unit 2: [Parachutes](#)

Unit 3: [Building a House Model](#)

Unit 4: [Paper Roller Coasters](#)

Unit 5: [Kelvin Hovercrafts](#)

Unit 6: [Mouse Trap Cars](#)

Unit 7: [KNEX Coasters](#)

Unit 8: [Science Car](#)

Unit 9: [Solar Robot](#)

Unit 10: [Solar Racer](#)

Unit 11: [Fuel Cell Car](#)

Unit 12: [Introduction to Google Sketch up](#)

Pacing Guide- Course

<u>Content</u>	Number of Days
<u>Unit 1:</u> Introduction to TECH ED II	5 days
<u>Unit 2:</u> Parachutes	15 days
<u>Unit 3:</u> Building a House Model	10 days
<u>Unit 4:</u> Paper Roller Coasters	20 days
<u>Unit 5:</u> Kelvin Hovercrafts	10 days
<u>Unit 6:</u> Mouse Trap Cars	10 days
<u>Unit 7:</u> KNEX Coasters	30 days
<u>Unit 8:</u> Science Car	10 days
<u>Unit 9:</u> Solar Robot	10 days
<u>Unit 10:</u> Solar Racer	10 days
<u>Unit 11:</u> Fuel Cell Car	10 days
<u>Unit 12:</u> Introduction to Google Sketch up	25 days
	33 weeks +/- 3 weeks +/- testing, assessments, writing

Unit 1:

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>What is "technology"?</p> <p>Why study technology?</p> <p>How does technology affect you?</p> <p>What is a definition of technology?</p> <p>What design methods industry use?</p>	<p>SWAT:</p> <p>Understand why we study Technology</p> <p>Define Technology</p> <p>Understand why Technology is used</p> <p>Identify various technological careers</p> <p>Understand how to operate in a safe classroom environment</p> <p>Understand how to maintain a clean and orderly classroom setting</p> <p>9.3.12.AC.1 9.3.12.AC.3 9.3.12.AC.5 9.3.12.AC.6 9.3.12.AC.7</p>	<p>Research samples of Technology used today and explain how they affect you on a daily basis.</p> <p>Make a collection of pictures that show products that satisfy needs.</p> <p>Collect five employment opportunities in a technological career and discuss the qualifications for each.</p>	<ul style="list-style-type: none"> • Teacher observations • Presentations • Projects • Rubrics • Checklists • Tests / quizzes • Self-evaluation

Unit 2:

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>Who invented the first parachute?</p> <p>Why people rely on them so much?</p> <p>How does the chute open?</p> <p>What is the measurement of an actual chute?</p> <p>What design methods industry use to make them?</p>	<p>SWAT:</p> <p>Understand how chutes work</p> <p>Understand why chutes are designed a certain way.</p> <p>Identify various measurements to slow down your chute.</p> <p>Understand how to operate a real parachute.</p> <p>Understand how to determine the relationship between areas.</p> <p>9.3.12.AC-DES.2 9.3.12.AC-DES.5 9.3.12.AC-DES.6 9.3.12.AC-DES.8</p>	<p>Research samples of parachutes and how they have evolved.</p> <p>Design a parachute that will carry an egg in its carton to the ground without breaking the egg.</p> <p>You made test several designs before deciding to stick to a specific parachute.</p>	<ul style="list-style-type: none"> • Teacher observations • Presentations • Projects • Rubrics • Checklists • Tests / quizzes • Self-evaluation

Unit 3:

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>What are the basic purposes of architectural models?</p> <p>Describe the types of design study models and explain their functions?</p> <p>What features does a presentation model usually include?</p> <p>Which type of model is used to promote the sale of land parcels?</p>	<p>SWAT:</p> <p>Understand design and study models.</p> <p>Explain the differences between presentation and design study models.</p> <p>Describe architectural models made for design study purposes.</p> <p>List the steps for creating a model.</p> <p>Identify each room and its corresponding space.</p> <p>9.3.12.AC.1 9.3.12.AC.6 9.3.12.AC-CST.4 9.3.12.AC-CST.8 9.3.12.AC-DES.1</p>	<p>Design and study models.</p> <p>Complete a computer model of a house you designed.</p> <p>Construct an architectural model.</p>	<ul style="list-style-type: none"> • Teacher observations • Presentations • Projects • Rubrics • Checklists • Tests / quizzes • Self-evaluation

Unit 4:

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>How fast can a roller coaster go?</p> <p>Describe the different types of design and their functions?</p> <p>What is your favorite roller coaster you like to ride?</p>	<p>SWAT:</p> <p>Understand motion and forces.</p> <p>Determine the optimal conditions of a roller coaster for maximum performance.</p> <p>Apply the design process.</p> <p>List all the components and materials needed to build a paper roller coaster.</p> <p>9.3.12.AC.1 9.3.12.AC.3 9.3.12.AC-CST.8 9.3.12.AC-DES.6</p>	<p>Discuss roller coaster and how they are used in real life.</p> <p>Construct a paper roller coaster.</p> <p>Construct an architectural model.</p>	<ul style="list-style-type: none"> • Teacher observations • Presentations • Projects • Rubrics • Checklists • Tests / quizzes • Self-evaluation

Unit 5:

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>What materials do you need to create a prototype hovercraft?</p> <p>How do Hovercrafts hover off the ground?</p> <p>What type of motor do hovers have?</p> <p>Why do you need to fans?</p>	<p><u>SWAT:</u></p> <p>Understand the properties of motion and forces.</p> <p>Perform tests to determine the materials properties</p> <p>Utilize appropriate materials to make it light weight.</p> <p>Understand how rotors emit air to push the craft.</p> <p>Understand what components are used to make a real life hovercraft.</p> <p>9.3.12.AC.1 9.3.12.AC.3 9.3.12.AC.6</p>	<p>Research hovercrafts and collect information and how to put one together.</p> <p>Sketch out a design on graph paper.</p> <p>Build a custom hovercraft out of everyday materials. Add propellers at bottom and in top to create the thrust you need to get it moving.</p>	<ul style="list-style-type: none"> • Teacher observations • Presentations • Projects • Rubrics • Checklists • Tests / quizzes • Self-evaluation

Unit 6:

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>Why is a mouse trap use to move the car?</p> <p>How is the string attached to the hanger and wheels?</p> <p>Where is the force coming from to push the car?</p>	<p>SWAT:</p> <p>Discuss different mouse trap car designs.</p> <p>Design and make simple objects using wood, metal and plastic materials.</p> <p>Identify the different components of a mouse trap car and what each component is responsible for.</p> <p>Select the correct method for joining materials</p> <p>Understand the concept of "Craftsmanship" in processing materials</p> <p>9.3.12.AC.1 9.3.12.AC.6 9.3.12.AC-CST.1</p>	<p>Research and understand basic designs for cars.</p> <p>Design and construct a vehicle powered by a mouse trap to go a minimum distance of 30 feet.</p> <p>Car must be at least 10" long and no wider than 3".</p> <p>Research material types used in class.</p>	<ul style="list-style-type: none"> • Teacher observations • Presentations • Projects • Rubrics • Checklists • Tests / quizzes • Self-evaluation

Unit 7:

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>Why are there different colors that are different sizes?</p> <p>What would happen if you choose the wrong color?</p> <p>What is the consequence of not lining things up?</p> <p>What is KNEX?</p>	<p>SWAT:</p> <p>Recognize many different types of structures.</p> <p>State where simple objects are used.</p> <p>List the advantages of a simple design.</p> <p>Identify systems having mechanical operations and explain their function</p> <p>Describe the function of a hydraulic or pneumatic system</p> <p>9.3.12.AC.2 9.3.12.AC.4 9.3.12.AC.6 9.3.12.AC-CST.2 9.3.12.AC-CST.7 9.3.12.AC-DES.8</p>	<p>Research samples of simple coasters.</p> <p>Design a simple working system.</p> <p>Work in groups of threes utilizing your knowledge of newton's law of motion to create a coaster that can carry a marble for the longest period.</p>	<ul style="list-style-type: none"> • Teacher observations • Presentations • Projects • Rubrics • Checklists • Tests / quizzes • Self-evaluation

Unit 8:

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>Does the material of the wheels affect the speed or handling of the car?</p> <p>How are you going to create axles to allow the wheels to spin freely?</p> <p>What is a short circuit?</p> <p>What is a parallel circuit?</p> <p>How high an incline can your car climb before stopping?</p>	<p>SWAT:</p> <p>Recognize many different types of wires and circuit boards.</p> <p>Understand different types of batteries and how size determines how fast and how long your car will last.</p> <p>Identify the loads when cross wiring.</p> <p>Analyze how to mount motors.</p> <p>9.3.12.AC.2 9.3.12.AC.4 9.3.12.AC.7</p>	<p>Research how energy is transferred from a battery through wires to a motor.</p> <p>Build a prototype science car with the materials provided by me.</p> <p>Identify wiring components and how positive and negative affects how fast the car goes.</p>	<ul style="list-style-type: none"> • Teacher observations • Presentations • Projects • Rubrics • Checklists • Tests / quizzes • Self-evaluation

Unit 9:

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>How does the sun power a robot without batteries?</p> <p>What type of solar panel you need to use?</p> <p>How does the shape of a panel affect the power that is stored on the cells?</p> <p>How has the robotic industry revolutionized the world we live in today?</p>	<p>SWAT:</p> <p>Understand the advantages of alternative energy.</p> <p>Explain the principals of solar power and how it works.</p> <p>Understand how joints should be connected to provide easy movements.</p> <p>Understand environmental impacts of clean energy.</p> <p>9.3.12.AC.2 9.3.12.AC.4 9.3.12.AC.6 9.3.12.AC-CST.4 9.3.12.AC-CST.6</p>	<p>Research samples of how robotics work.</p> <p>Sketch a design on a paper of a robotic figure provided In the work sheet.</p> <p>Create a solar powered robot that can be transformed to a wheel-bot and Quadru-bot.</p> <p>Design and construct a variety of assembly's to make moving parts.</p> <p>A 14 in 1 Kit educational solar robot is provided.</p>	<ul style="list-style-type: none"> • Teacher observations • Presentations • Projects • Rubrics • Checklists • Tests / quizzes • Self-evaluation

Unit 10:

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>Why is most of the solar cars light weight?</p> <p>Is it true that Many solar-powered cars have a maximum speed between 40 and 60 miles per hour?</p> <p>How do calculate the gear ratio used in the drive system of their solar powered car.</p> <p>How has transportation affected the environment?</p>	<p><u>SWAT:</u></p> <p>Learn how a solar module can power a motor instead of a traditional battery</p> <p>Learn how motors and automotive transmissions work.</p> <p>Understand and differentiate different types of frames.</p> <p>Understand that Solar-powered cars use electric motors instead of internal combustion engines.</p> <p>Know that solar energy is a renewable energy source, and its utilization has numerous benefits for our environment.</p> <p>9.3.12.AC.2 9.3.12.AC.5 9.3.12.AC.6 9.3.12.AC-CST.3 9.3.12.AC-CST.4</p>	<p>Put together a sun power motorized kit.</p> <p>Design a way to attach your pieces of frames together without having to jeopardize the structure.</p> <p>Design and create wheels out soft plastic and then soak it soluble support to harden the wheels.</p> <p>Connect the differential to the motor.</p>	<ul style="list-style-type: none"> • Teacher observations • Presentations • Projects • Rubrics • Checklists • Tests / quizzes • Self-evaluation

Unit 11:

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>What is a fuel cell?</p> <p>How does electrical current work?</p> <p>Why is this revolutionary?</p> <p>Name two major impacts of energy and power technology?</p> <p>How do you contain this energy?</p>	<p>SWAT:</p> <p>Understand how fuel with pure hydrogen gas is stored directly on a vehicle</p> <p>Understand the difference between direct electrical and passive electrical.</p> <p>Identify the various forms of composition.</p> <p>Understand how energy can be transferred through contact.</p> <p>Distinguish between renewable and nonrenewable sources of energy.</p> <p>List advantages and disadvantages of each type of energy.</p> <p>9.3.12.AC.1 9.3.12.AC.2 9.3.12.AC.6</p>	<p>Research fuel cell car and its components.</p> <p>Determining the minimum voltage for water decomposition.</p> <p>The effect of heat on solar panels.</p> <p>The effect of tilt angle on solar panels.</p> <p>Experiment the excitement of new fuel cell technology with this customized construction kit. In building this car, you will discover the possibility of using 100% clean fuel to power cars of the future.</p>	<ul style="list-style-type: none"> • Teacher observations • Presentations • Projects • Rubrics • Checklists • Tests / quizzes • Self-evaluation

Unit 12:

Essential Questions	Instructional Objectives/ Skills and Benchmarks (CPIs)	Activities	Assessments
<p>What is google sketch up?</p> <p>Who invented this program and what was its purpose?</p> <p>What is 3d modeling?</p> <p>What are the primary tools needed to draw basic shapes?</p> <p>Name four types of surfaces that can be used to slice objects?</p> <p>Describe the three panes of the render window?</p> <p>What is the purpose of viewports?</p> <p>How can a 2d section view be converted to a 3d solid model?</p>	<p>SWAT:</p> <p>Explain the dynamic feedback presented when constructing solid primitives.</p> <p>Describe how to locate points in 3d space.</p> <p>Explain the function of the ribbon.</p> <p>Identify the functions of the viewport controls and the view cube.</p> <p>Use the navigation bar to perform a variety of display manipulation functions.</p> <p>Describe the function of the world and user coordinate systems.</p> <p>9.3.12.AC.3 9.3.12.AC.5 9.3.12.AC.7</p>	<p>Draw 3d polylines.</p> <p>Create and save viewport configurations.</p> <p>Create solids and surfaces by extruding 2d profiles.</p> <p>Extrude and revolve objects using constraints.</p> <p>Sweep shapes along a 2d or 3d path to create a solid surface object.</p> <p>Remove features from a solid model.</p> <p>Create still shots of 3d models.</p>	<ul style="list-style-type: none"> • Teacher observations • Presentations • Projects • Rubrics • Checklists • Tests / quizzes • Self-evaluation

New Jersey Core Curriculum Content Standards
Academic Area

9.3- Career & Technical Education (CTE)
Content Area: 21st Century Life and Careers

CONTENT AREA:	STANDARD 9.3 CAREER AND TECHNICAL EDUCATION
ARCHITECTURE & CONSTRUCTION CAREER CLUSTER	
Number	Standard Statement
	By the end of Grade 12, Career and Technical Education Program completers will be able to:
Career Cluster:	Architecture & Construction (AC)
9.3.12.AC.1	Use vocabulary, symbols and formulas common to architecture and construction.
9.3.12.AC.2	Use Architecture and construction skills to create and manage a project.
9.3.12.AC.3	Comply with regulations and applicable codes to establish and manage a legal and safe workplace.
9.3.12.AC.4	Evaluate the nature and scope of the Architecture & Construction Career Cluster and the role of architecture and construction in society and the economy.
9.3.12.AC.5	Describe the roles, responsibilities, and relationships found in the architecture and construction trades and professions, including labor/management relationships.
9.3.12.AC.6	Read, Interpret and use technical drawings, documents and specifications to plan a project.
9.3.12.AC.7	Describe career opportunities and means to achieve those opportunities in each of the Architecture & Construction Career Pathways.

PATHWAY:	Construction (AC-CST)
9.3.12.AC-CST.1	Describe contractual relationships between all parties involved in the building process.
9.3.12.AC-CST.2	Describe approval procedures required for successful completion of a construction project.
9.3.12.AC-CST.3	Implement testing and inspection procedures to ensure successful completion of a construction project.
9.3.12.AC-CST.4	Apply scheduling practices to ensure the successful completion of a construction project.
9.3.12.AC-CST.5	Apply practices and procedures required to maintain jobsite safety.
9.3.12.AC-CST.6	Manage relationships with internal and external parties to successfully complete construction projects.
9.3.12.AC-CST.7	Compare and contrast the building systems and components required for a construction project.
9.3.12.AC-CST.8	Demonstrate the construction crafts required for each phase of a construction project.
9.3.12.AC-CST.9	Safely use and maintain appropriate tools, machinery, equipment and resources to accomplish construction project goals.
PATHWAY:	Design/Pre-Construction (AC-DES)
9.3.12.AC-DES.1	Justify design solutions through the use of research documentation and analysis of data.
9.3.12.AC-DES.2	Use effective communication skills and strategies (listening, speaking, reading, writing and graphic communications) to work with clients and colleagues.
9.3.12.AC-DES.3	Describe the requirements of the integral systems that impact the design of buildings
9.3.12.AC-DES.4	Apply building codes, laws and rules in the project design.
9.3.12.AC-DES.5	Identify the diversity of needs, values and social patterns in project design, including accessibility standards.

9.3.12.AC-DES.6	Apply the techniques and skills of modern drafting, design, engineering and construction to projects.
9.3.12.AC-DES.7	Employ appropriate representational media to communicate concepts and project design.
9.3.12.AC-DES.8	Apply standards, applications and restrictions pertaining to the selection and use of construction materials, components and assemblies in the project design
PATHWAY:	Maintenance/Operations (AC-MO)
9.3.12.AC-MO.1	Recognize and employ universal construction signs and symbols to function safely in the workplace.
9.3.12.AC-MO.2	Use troubleshooting procedures when solving a maintenance problem in buildings.
9.3.12.AC-MO.3	Apply construction skills when repairing, restoring or renovating existing buildings.
9.3.12.AC-MO.4	Determine work required to repair or renovate an existing building.
9.3.12.AC-MO.5	Plan and practice preventative maintenance activities to service existing buildings.
9.3.12.AC-MO.6	Maintain and inspect building systems to achieve safe and efficient operation of buildings.

New Jersey Scoring Rubric
New Jersey Registered Holistic Scoring Rubric - GEPA/HSPA

In Scoring, consider the grid of written language	Inadequate Command		Limited Command		Partial Command		Adequate Command		Strong Command		Superior Command	
	Score	1	2	3	4	5	6					
Content & Organization	<ul style="list-style-type: none"> May lack opening and/or closing Minimal response to topic; uncertain focus No planning evident; disorganized 	<ul style="list-style-type: none"> May lack opening and/or closing Attempts to focus May drift or shift focus Attempts organization Few, if any, transitions between ideas 	<ul style="list-style-type: none"> Usually has single focus Some lapses or flaws in organization May lack some transitions between ideas 	<ul style="list-style-type: none"> Generally has opening and/or closing Single focus Ideas loosely connected Transition evident 	<ul style="list-style-type: none"> Opening and closing Single focus Sense of unity and coherence Key ideas developed Logical progression of ideas Moderately fluent Attempts compositional risks 	<ul style="list-style-type: none"> Opening and closing Single, distinct focus Unified and coherent Well-developed Logical progression of ideas Fluent, cohesive Compositional risks successful 						
Usage	<ul style="list-style-type: none"> Details random, inappropriate, or barely apparent No apparent control Severe/numerous errors 	<ul style="list-style-type: none"> Details lack elaboration, i.e., highlight paper Numerous errors 	<ul style="list-style-type: none"> Repetitious details Several unelaborated details Errors/ patterns of errors may be evident 	<ul style="list-style-type: none"> Uneven development of details Some errors that do not interfere with meaning 	<ul style="list-style-type: none"> Details appropriate and varied Few errors 	<ul style="list-style-type: none"> Details effective, vivid, explicit, and/or pertinent Very few, if any, errors 						
Sentence Construction	<ul style="list-style-type: none"> Assortment of incomplete and/or incorrect sentences 	<ul style="list-style-type: none"> Excessive monotony/ same structure Numerous errors 	<ul style="list-style-type: none"> Little variety in syntax Some errors 	<ul style="list-style-type: none"> Some errors that do not interfere with meaning 	<ul style="list-style-type: none"> Few errors 	<ul style="list-style-type: none"> Very few, if any, errors 						
Mechanics	<ul style="list-style-type: none"> Errors so severe they detract from meaning 	<ul style="list-style-type: none"> Numerous serious errors 	<ul style="list-style-type: none"> Patterns of errors evident 	<ul style="list-style-type: none"> No consistent pattern of errors Some errors that do not interfere with meaning 	<ul style="list-style-type: none"> Few errors 	<ul style="list-style-type: none"> Very few, if any, errors 						

Holistic Scoring Guide for Mathematics Open-Ended (OE) Items (Generic Rubric)

3 - Point Response

The response shows complete understanding of the problem's essential mathematical concepts. The student executes procedures completely and gives relevant responses to all parts of the task. The response contains few minor errors, if any. The response contains a clear, effective explanation detailing how the problem was solved so that the reader does not need to infer how and why decisions were made.

2 - Point Response

The response shows nearly complete understanding of the problem's essential mathematical concepts. The student executes nearly all procedures and gives relevant responses to most parts of the task. The response may have minor errors. The explanation detailing how the problem was solved may not be clear, causing the reader to make some inferences.

1 - Point Response

The response shows limited understanding of the problem's essential mathematical concepts. The response and procedures may be incomplete and/or may contain major errors. An incomplete explanation of how the problem was solved may contribute to questions as to how and why decisions were made.

0 - Point Response

The response shows insufficient understanding of the problem's essential mathematical concepts. The procedures, if any, contain major errors. There may be no explanation of the solution or the reader may not be able to understand the explanation. The reader may not be able to understand how and why decisions were made.