

Pascack Valley Regional High School District

**Pascack Hills High School, Montvale, New Jersey
Pascack Valley High School, Hillsdale, New Jersey**

Course Name: Architecture

Born On: August, 2020
Previous Revision: August, 2023
Current Revision: August, 2026
Board Approval: 8/24/26

New Jersey Curricular Mandates for Technology Education

Disabled & LGBT:

18A:35-4.35 - History of disabled and LGBT persons included in middle and high school curriculum. A board of education shall include instruction on the political, economic, and social contributions of persons with disabilities and lesbian, gay, bisexual, and transgender people, in an appropriate place in the curriculum of middle school and high school students as part of the district's implementation of the New Jersey Student Learning Standards.

Diversity, Equity, and Inclusion (DEI):

C.18A:35-4.36a - Curriculum to include instruction on diversity and inclusion. 1. a. Beginning in the 2021-2022 school year, each school district shall incorporate instruction on diversity and inclusion in an appropriate place in the curriculum of students in grades kindergarten through 12 as part of the district's implementation of the New Jersey Student Learning Standards. b. The instruction shall: (1) highlight and promote diversity, including economic diversity, equity, inclusion, tolerance, and belonging in connection with gender and sexual orientation, race and ethnicity, disabilities, and religious tolerance; (2) examine the impact that unconscious bias and economic disparities have at both an individual level and on society as a whole; and (3) encourage safe, welcoming, and inclusive environments for all students regardless of race or ethnicity, sexual and gender identities, mental and physical disabilities, and religious beliefs. c. The Commissioner of Education shall provide school districts with sample learning activities and resources designed to promote diversity and inclusion.

Amistad Law:

N.J.S.A. 18A 52:16A-88 Every board of education shall incorporate the information regarding the contributions of African Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

Climate Change:

2026 NJSL-Computer Science and Design Thinking: At the core of computer science and design thinking education, is the goal to prepare students with the essential knowledge and skills to make their local and global communities a better place to live. Learning experiences that enable students to apply content knowledge and employ computational thinking skills prepare students for the work of tomorrow by proposing solutions concerning the balancing of societal, environmental, and economic needs for a sustainable future. Further, leveraging topics such as computational sustainability and clean technology (Cleantech), technologies that either reduce or optimize the use of natural resources while reducing the negative effect that technology has on the planet and its ecosystems, is essential for developing a populace with the knowledge and skills necessary to mitigate the effects of climate change.

Introduction to Architecture & Design			
Unit 1: Introduction to Architecture & Construction Techniques			
Time Allotted: Approximately 4-5 Weeks			
New Jersey Student Learning Standards (NJSLS)			
8.2.12.ED.1: Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers. 8.2.12.ED.2: Create scaled engineering drawings for a new product or system and make modifications to increase optimization based on feedback. 8.2.12.ED.3: Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis. 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.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.			
Essential Questions	Student Learning Objectives	Suggested Tasks/Activities	Evidence of Learning (Assessment)
➤ What is architecture? ➤ Why do we need balance between the form and utility in architecture? ➤ Who are famous architects and how have they influenced history or the future of architecture? ➤ How does analyzing architectural failures help us learn to prevent future mistakes? ➤ What are the consequences of decisions made during the design process?	➤ Define “architecture”. ➤ List characteristics of architectural forms and particular styles. ➤ List uses of architecture, as related to the forms. ➤ Identify the problems that later architectural styles were designed to solve. ➤ Identify systems currently used in architecture that are generally considered “basic requirements”, i.e. plumbing, electrical, safety, foundation, framing, etc.) ➤ Explain how architecture is a problem-based design process. ➤ Predict the consequences of decisions made during the design process.	➤ Rapid Design & Redesign Challenge: (ex. Bridge/Structure to hold up textbooks) ➤ Create a digital presentation about one of the significant structures that have been designed and built around the world highlighting the following: <i>What problem(s) did this structure solve, what problems did it create (if any), and what did we learn about this design?</i> ➤ Design a poster presentation about Famous Architects including impact on historic and future architecture, well known work and styles, and social impacts of designs ➤ Create a digital presentation of a particular architecture	● Assessment of gathering, evaluation, synthesis and communication of information about famous architects, significant structures, and/or architecture style in project research, submissions and presentation ● Assessment of written and verbal mastery of unit-specific vocabulary, through conversation and writing samples. ● Assessment of modeling skills by drawing and labeling diagrams, making analogies, building 3D structures, and/or making observational sketches. ● Assessment of the Design

	➤ Describe the various construction techniques utilized in architecture in the past and present. ➤ Compare and contrast the features and uses of a floor plan, elevation, and section.	style, including typical sectional and elevation views, the history, the construction technique used, and the pros/cons of that particular style. Include a few famous examples, along with their floor plans, sectional and elevation views. ➤ Create a presentation on Architectural Failures (i.e. Tacoma Narrows Bridge) and discuss why it was a failure, what engineers/architects learned from the failure, and its impact on history and society ➤ Construction techniques and basic engineering project (i.e. House of Cards Design Challenge & Redesign) ➤ Given examples, identify floor plans, elevations, and sections. ➤ Create a conceptual sketch ➤ Create a 2-point perspective drawing	Process skill by participating in the rapid design project, including journaling or other written responses, if required.
Resources/Materials	- Paper, Rulers /Scale, X-Acto knives, Scissors, Tape, Manila folders, Computers, Internet access, Resource Texts		
Interdisciplinary Connections	SL.PE.11-12.1 Initiate and participate effectively in a range of collaborative discussions with diverse partners on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. SL.II.11-12.2 Integrate multiple sources of information presented in diverse media or formats to make informed decisions and solve problems, evaluating the credibility and accuracy of each source.		

	RI.MF.11-12.6 Analyze, integrate, and evaluate multiple sources of information presented in different media and formats, as well as in words, in order to address a question, solve a problem, or make informed decisions.
Life Literacies & Key Skills	9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas 9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities 9.4.12.CI.3: Investigate new challenges and opportunities for personal growth, advancement, and transition 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving
Information and Media Literacy & Technology Literacy	9.4.12.IML.1: Compare search browsers and recognize features that allow for filtering of information. 9.4.12.IML.2: Evaluate digital sources for timeliness, accuracy, perspective, credibility of the source, and relevance of information, in media, data, or other resources 9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design 9.4.12.IML.4: Assess and critique the appropriateness and impact of existing data visualizations for an intended audience 9.4.12.IML.5: Evaluate, synthesize, and apply information on climate change from various sources appropriately 9.4.12.IML.6: Use various types of media to produce and store information on climate change for different purposes and audiences with sensitivity to cultural, gender, and age diversity 9.4.12.IML.7: Develop an argument to support a claim regarding a current workplace or societal/ethical issue such as climate change 9.4.12.IML.8: Evaluate media sources for point of view, bias, and motivations 9.4.12.IML.9: Analyze the decisions creators make to reveal explicit and implicit messages within information and media 9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task 9.4.12.TL.2: Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data. 9.4.12.TL.3: Analyze the effectiveness of the process and quality of collaborative environments. 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem 9.2.12.CAP.7: Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest. 9.2.12.CAP.8: Determine job entrance criteria (e.g., education credentials, math/writing/reading comprehension tests, drug tests) used by employers in various industry sectors.
Career Readiness, Life Literacies & Key Skills Practices	Demonstrate creativity and innovation. Plan education and career paths aligned to personal goals. Use technology to enhance productivity, increase collaboration, and communicate effectively. Work productively in teams while using cultural/global competence.

Modifications			
Multi-Lingual Learners	Special Education	At-Risk	Gifted and Talented
- When possible, modify assignments so the ELL student writes less, has simpler questions to answer, fewer spelling words, etc. - Provide models of completed homework assignments, projects, etc. - Assign a native language partner. - Use sentence/paragraph frames to assist with projects.	- Provide extended time for the creation of products. - Scaffolded explanations for proper use of equipment. - Receive large project as smaller tasks with individual deadlines.	- Incorporate student choice. - Provide peer mentoring to improve techniques. - Use effort and achievement rubrics - Allow students many opportunities for practice and learning. - Use scaffolding for complex tasks. - Evaluate students on the basis of individual mastery.	- Offer choices, once finished with basic task, with personal interest being the key. - Look up local ordinances restricting residential building. - Pick 2 structures to contrast either the same culture, different time periods or different cultures, same time period.

Architecture & Design			
Unit 2: Safety			
Time Allotted: Approximately 1-2 weeks			
New Jersey Student Learning Standards (NJSL)			
9.3.12.AC.3 Comply with regulations and applicable codes to establish and manage a legal and safe workplace.			
8.2.12.ED.5: Evaluate the effectiveness of a product or system based on factors that are related to its requirements, specifications, and constraints (e.g., safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, ergonomics).			
Essential Questions	Student Learning Objectives	Suggested Tasks/Activities	Evidence of Learning (Assessment)
➤ How do we create a working environment that is safe, efficient, and meets regulations?	➤ Identify the safety considerations for the technological design process. ➤ Define efficiency. ➤ Properly and safely handle and maintain tools and machinery used in project design process (i.e. Xacto Knife, Bandsaw, Drill Press, Belt Sander, Hot Glue Gun, etc.) ➤ Understand OSHA Safety Regulations ➤ Understand clothing requirements in	➤ Scavenger hunt to identify tools and precautions in the classroom and shop. ➤ Hands-on project on Safety to demonstrate understanding, maintenance, and handling of tools and other safety requirements. ➤ Written Test on Safety to	- Assessment of written and verbal mastery of safety rules and procedures, through performance tasks, practical, and/or writing samples. - Assessment of mastery of unit-specific tools and techniques using a practical or performance.

	the classroom. ➤ Identify and properly use personal protective equipment. ➤ Identify the relationship among the amount of material used, cost, and requirements of a project. ➤ Define over-engineering and relate to project design.	demonstrate understanding, maintenance, and handling of tools and other safety requirements.	
Resources/Materials	- Wood - Machinery: Sander, Bandsaw, Drill Press, Laser Cutter - OSHA Safety Guidelines: https://www.osap.org/page/GuideOSHAh		
Interdisciplinary Connections	SL.PE.11-12.1 Initiate and participate effectively in a range of collaborative discussions with diverse partners on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. SL.II.11-12.2 Integrate multiple sources of information presented in diverse media or formats to make informed decisions and solve problems, evaluating the credibility and accuracy of each source. RI.MF.11-12.6 Analyze, integrate, and evaluate multiple sources of information presented in different media and formats, as well as in words, in order to address a question, solve a problem, or make informed decisions. RI.CR.11-12.1 Cite a range of thorough textual evidence and make clear and relevant connections to strongly support an analysis of multiple aspects of what an informational text says explicitly and inferentially, as well as interpretations of the text. W.PD.11-12.4 Produce clear and coherent writing in which the development, organization, style, and tone are appropriate to task, purpose, and audience.		
Life Literacies & Key Skills	9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas 9.4.12.CI.3: Investigate new challenges and opportunities for personal growth, advancement, and transition 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving		
Information and Media Literacy & Technology Literacy	9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design 9.4.12.TL.3: Analyze the effectiveness of the process and quality of collaborative environments. 9.2.12.CAP.7: Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest. 9.2.12.CAP.8: Determine job entrance criteria (e.g., education credentials, math/writing/reading comprehension tests, drug tests) used by employers in various industry sectors.		
Career Readiness, Life Literacies & Key Skills	Demonstrate creativity and innovation. Utilize critical thinking to make sense of problems and persevere in solving them.		

Practices	Work productively in teams while using cultural/global competence.		
Modifications			
Multi-Lingual Learners	Special Education	At-Risk	Gifted and Talented
● Add written labels to equipment. ● Assign a native language partner. ● Provide extended time for written responses and reports.	● Provide an outline of lessons. ● Receive large project as smaller tasks with individual deadlines. ● Work or take a test in a different setting, such as a quiet room with few distractions.	● Allow students many opportunities for practice and learning. ● Use scaffolding for complex tasks.	● Offer choices, once finished with basic task, with personal interest being the key. ● Look up history of safety regulations or reporting of serious accidents in residences or factories/workplaces. ● Investigate efficiency.

Architecture & Design			
Unit 3: Architectural Plans & Working in Scale			
Time Allotted: Approximately 5-6 Weeks			
New Jersey Student Learning Standards (NJSLS)			
8.2.12.ED.1: Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers. 8.2.12.ED.2: Create scaled engineering drawings for a new product or system and make modification to increase optimization based on feedback. 8.2.12.ED.6: Analyze the effects of changing resources when designing a specific product or system (e.g., materials, energy, tools, capital, labor). 8.2.12.ITH.1: Analyze a product to determine the impact that economic, political, social, and/or cultural factors have had on its design, including its design constraints. 8.2.12.ITH.2: Propose an innovation to meet future demands supported by an analysis of the potential costs, benefits, trade-offs, and risks related to the use of the innovation. 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.6 Read, interpret and use technical drawings, documents and specifications to plan a project.			
Essential Questions	Student Learning Objectives	Suggested Tasks/Activities	Evidence of Learning (Assessment)
➤ What is scale? ➤ Why are different scales applicable for different types of architectural plans? ➤ What are the pros	➤ Describe the purpose of an architect's scale. ➤ Identify the purpose of a scaled drawing. ➤ Explain how to create and use a useful scale.	➤ Use a scale to sketch a few simple as well as more complex objects. ➤ Practice with tools and techniques for drawing the floor plan.	➤ Assessment of mastery of unit-specific tools and techniques using a practical or performance. ➤ Assessment of modeling skills by drawing and labeling diagrams, making analogies, and/or making

and cons of creating a scaled floor plan of a residence? ➤ How does an architect's scale aid in the creation of hand-drawn blueprints, and how does it help us read and interpret blueprints? ➤ What are elevation drawings and purpose do they serve?	➤ Use a design to convey information to someone unfamiliar with the idea. ➤ Compare and contrast an architectural drawing, an artistic drawing, and an engineering drawing. ➤ Convey an idea by sketching thoughts to paper. ➤ Create a sketch of a single-story house ➤ Create a sectional view of one wall of a single-story house. ➤ Identify the purpose of an elevation. ➤ Distinguish between the value of an elevation for the client versus the architect. ➤ Identify the key features of an elevation drawing. ➤ Interpret elevation drawings. ➤ Use a floor plan to create an elevation of a single-story house	➤ Practice sketching ideas, given a variety of "problems" or "situations" ➤ Practice drawing sectional views. ➤ Given a scale and general layout, practice drawing a floor plan and elevations ➤ Create a detailed, scaled floor plan of a single-story home, including a sectional view of one wall and an elevation drawing. ➤ Critique scaled floor plans and elevations that are purposely flawed.	observational sketches. ➤ Assessment of problem solving skills when designing a scaled floor plan of a single-story home. ➤ Assessment of providing and using feedback by completing a peer-evaluation of a floor plan. ➤ Assessment of written and verbal mastery of unit-specific vocabulary. ➤ Assess critiqued floor plans critiques for the construction of explanations and arguments based upon evidence
Resources/Materials	- Computer with applications for CAD - Hand sketching with pencil on paper - Sample designs and blueprints		
Interdisciplinary Connections	SL.PE.11-12.1 Initiate and participate effectively in a range of collaborative discussions with diverse partners on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. SL.II.11-12.2 Integrate multiple sources of information presented in diverse media or formats to make informed decisions and solve problems, evaluating the credibility and accuracy of each source.		

	RI.MF.11-12.6 Analyze, integrate, and evaluate multiple sources of information presented in different media and formats, as well as in words, in order to address a question, solve a problem, or make informed decisions.		
Life Literacies & Key Skills	9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas 9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities 9.4.12.CI.3: Investigate new challenges and opportunities for personal growth, advancement, and transition 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving		
Information and Media Literacy & Technology Literacy	9.4.12.IML.1: Compare search browsers and recognize features that allow for filtering of information. 9.4.12.IML.2: Evaluate digital sources for timeliness, accuracy, perspective, credibility of the source, and relevance of information, in media, data, or other resources 9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design 9.4.12.IML.4: Assess and critique the appropriateness and impact of existing data visualizations for an intended audience 9.4.12.IML.5: Evaluate, synthesize, and apply information on climate change from various sources appropriately 9.4.12.IML.6: Use various types of media to produce and store information on climate change for different purposes and audiences with sensitivity to cultural, gender, and age diversity 9.4.12.IML.7: Develop an argument to support a claim regarding a current workplace or societal/ethical issue such as climate change 9.4.12.IML.8: Evaluate media sources for point of view, bias, and motivations 9.4.12.IML.9: Analyze the decisions creators make to reveal explicit and implicit messages within information and media 9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task 9.4.12.TL.2: Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data. 9.4.12.TL.3: Analyze the effectiveness of the process and quality of collaborative environments. 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem 9.2.12.CAP.7: Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest. 9.2.12.CAP.8: Determine job entrance criteria (e.g., education credentials, math/writing/reading comprehension tests, drug tests) used by employers in various industry sectors.		
Career Readiness, Life Literacies & Key Skills Practices	Demonstrate creativity and innovation. Utilize critical thinking to make sense of problems and persevere in solving them. Use technology to enhance productivity, increase collaboration, and communicate effectively. Work productively in teams while using cultural/global competence.		
Modifications			
Multi-Lingual Learners	Special Education	At-Risk	Gifted and Talented
• When possible, modify assignments so the ELL student writes less, has simpler questions to answer,	• Provide an outline of lessons. • Get a written list of instructions. • Receive large project as smaller	• Incorporate student choice. • Encourage and ensure students that they can be successful. • Allow students multiple opportunities	• Offer choices, once finished with basic task, with personal interest being the key.

- fewer spelling words, etc. - Provide models of completed homework assignments, projects, etc. - Assign a native language partner.	tasks with individual deadlines.	for practice and learning.	- Investigate Asian or African building techniques to contrast to American and/or European. - Draw a sketch of your dream residence and defend its features.
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Architectural Design			
Unit 4: Residential Design & Interior Space Planning			
Time Allotted: Approximately 6-7 Weeks			
New Jersey Student Learning Standards (NJSLs)			
8.2.12.ED.1: Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers. 8.2.12.ED.2: Create scaled engineering drawings for a new product or system and make modifications to increase optimization based on feedback. 8.2.12.ED.3: Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis. 8.2.12.ED.6: Analyze the effects of changing resources when designing a specific product or system (e.g., materials, energy, tools, capital, labor). 8.2.12.NT.2: Redesign an existing product to improve form or function. 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.6 Read, interpret and use technical drawings, documents and specifications to plan a project.			
Essential Questions	Student Learning Objectives	Suggested Tasks/Activities	Evidence of Learning (Assessment)
➤ How does an architect design the features and layout of a residence with both precision and creativity? ➤ What role do architects play in the interior design and space planning of a residence?	➤ Distinguish the features of a structure that makes it residential. ➤ Identify various styles of residential structures. ➤ List rooms that are social, private, and/or utility spaces (sleeping, living, & service areas). ➤ Describe the characteristics of a house that create a comfortable balance between social, private, and utility space. ➤ Distinguish between room placement and traffic flow. ➤ Describe the relationship between	➤ Practice with measuring tools and techniques. ➤ Given floor plans, identify styles. ➤ Identify what a system is and the various systems in a home (foundation, framing, electrical, plumbing) ➤ Create, with precision and accuracy, the first floor of your residence. Include all dimensions of key features (windows, doors, outlets) but not to scale.	➤ Assessment of mastery of unit-specific tools and techniques using a practical or performance. ➤ Assessment of modeling skills by drawing and labeling diagrams, making analogies, and/or making observational sketches. ➤ Assessment of problem solving skills when designing a scaled floor plan of a single-story home. ➤ Assessment of providing

	room placement and traffic flow. ➤ For each type of basic house design, describe how the layout and organization meets our design needs. ➤ Identify what rooms are a “grouping” ➤ Recall the various systems in a house: foundation, framing, electrical, plumbing) ➤ Describe the various room designs. ➤ State the sizes of each living area room. ➤ Define the purposes of each living area room. ➤ Illustrate the flow of the living area rooms in relation to each other. ➤ Use a ruler and measuring tape to find lengths with precision. ➤ Draw a 2D model of a residence, labeled with accurate measurements.	➤ Design a dream kitchen or room in a house based on criteria and constraints such as budget. Model the design in 3D software (i.e. CAD, Revit, Onshape, Homestyler) and also to scale with physical materials such as balsa wood, cardboard, matboard, paper, etc. ➤ Conduct a peer-evaluation of the floor plans, to assess understanding of grouping, traffic flow, types and purposes of spaces and residential styles. ➤ Given a purposefully-flawed template, identify a problem that could be solved by altering the layout of floor plan.	and using feedback by completing a peer-evaluation of a floor plan. ➤ Assessment of written and verbal mastery of unit-specific vocabulary. ➤ Assess floor plan critiques for the identification of problems, construction of explanations, and arguments based upon evidence
Resources/Materials	- Sample designs, Sketching tools and programs		
Interdisciplinary Connections	SL.PE.11-12.1 Initiate and participate effectively in a range of collaborative discussions with diverse partners on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. SL.II.11-12.2 Integrate multiple sources of information presented in diverse media or formats to make informed decisions and solve problems, evaluating the credibility and accuracy of each source. HS-ETS1-2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. HS-ETS1-3 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.		
Life Literacies & Key Skills	9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas 9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities		

	9.4.12.CI.3: Investigate new challenges and opportunities for personal growth, advancement, and transition 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving		
Information and Media Literacy & Technology Literacy	9.4.12.IML.1: Compare search browsers and recognize features that allow for filtering of information. 9.4.12.IML.2: Evaluate digital sources for timeliness, accuracy, perspective, credibility of the source, and relevance of information, in media, data, or other resources 9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design 9.4.12.IML.4: Assess and critique the appropriateness and impact of existing data visualizations for an intended audience 9.4.12.IML.5: Evaluate, synthesize, and apply information on climate change from various sources appropriately 9.4.12.IML.6: Use various types of media to produce and store information on climate change for different purposes and audiences with sensitivity to cultural, gender, and age diversity 9.4.12.IML.7: Develop an argument to support a claim regarding a current workplace or societal/ethical issue such as climate change 9.4.12.IML.8: Evaluate media sources for point of view, bias, and motivations 9.4.12.IML.9: Analyze the decisions creators make to reveal explicit and implicit messages within information and media 9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task 9.4.12.TL.2: Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data. 9.4.12.TL.3: Analyze the effectiveness of the process and quality of collaborative environments. 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem 9.2.12.CAP.7: Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest. 9.2.12.CAP.8: Determine job entrance criteria (e.g., education credentials, math/writing/reading comprehension tests, drug tests) used by employers in various industry sectors.		
Career Readiness, Life Literacies & Key Skills Practices	Consider the environmental, social, and economic impacts of decisions. Demonstrate creativity and innovation. Utilize critical thinking to make sense of problems and persevere in solving them. Use technology to enhance productivity, increase collaboration, and communicate effectively. Work productively in teams while using cultural/global competence.		
Modifications			
Multi-Lingual Learners	Special Education	At-Risk	Gifted and Talented
• Provide a variety of texts and resources on curriculum topics at a range of reading levels. • Provide models of completed homework assignments, projects, etc.	• Receive large project as smaller tasks with individual deadlines • Use an alarm to help with time management. • Work with a partner • Only do one room, instead of the entire floor.	• Incorporate student choice • Provide peer mentoring. • Use scaffolding for complex tasks.	• Offer choices, once finished with basic task, with personal interest being the key. • Revisit sketch of “dream home” and add reasonable measurements. Defend its features

Provide extended time for written responses and reports.			in terms of flow, design type, and the other objectives of this unit. Include the measurements on the sketch of another floor or level of your home
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Architectural Design			
Unit 5: Architectural CAD Techniques & Modeling			
Time Allotted: Approximately 10 Weeks			
New Jersey Student Learning Standards (NJSLS)			
8.2.12.ED.1: Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers. 8.2.12.ED.2: Create scaled engineering drawings for a new product or system and make modifications to increase optimization based on feedback. 8.2.12.ED.6: Analyze the effects of changing resources when designing a specific product or system (e.g., materials, energy, tools, capital, labor). 8.2.12.NT.1: Explain how different groups can contribute to the overall design of a product. 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.6 Read, interpret and use technical drawings, documents and specifications to plan a project. 8.2.12.ETW.3: Identify a complex, global environmental or climate change issue, develop a systemic plan of investigation, and propose an innovative sustainable solution. 8.2.12.ED.4: Design a product or system that addresses a global problem and document decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience.			
Essential Questions	Student Learning Objectives	Suggested Tasks/Activities	Evidence of Learning (Assessment)
➤ How does CAD support the development of models? ➤ What are the pros and cons to using CAD as opposed to hand drawing / physical modeling?	➤ Describe the features and characteristics of Computer-aided design (CAD). ➤ Describe some applications of CAD and technical drawing. ➤ Distinguish between the applications of CAD and traditional technical drawing. ➤ Describe how (and why) today's workplace integrates modern technology and more traditional approaches. ➤ Interpret CAD drawings.	➤ Create a CAD plan of a single-story home. ➤ Create a CAD plan of a Tiny Home based on Green Architecture and Sustainable Design ➤ Create a CAD plan of a client's Dream Home ➤ Critique a CAD plan that is purposely flawed.	➤ Assessment of mastery of unit-specific tools and techniques using a practical or performance. ➤ Assessment of modeling skills by using CAD. ➤ Assessment of problem solving skills when designing a CAD-designed plan of a single-story

	➤ Create a CAD plan of one floor of a single-story house. ➤ Distinguish between a prototype and working set of plans of a home		home. ➤ Assessment of providing and using feedback by completing a peer-evaluation of CAD design. ➤ Assessment of written and verbal mastery of unit-specific vocabulary. ➤ Assess CAD design for the identification of problems, construction of explanations, and arguments based upon evidence
Resources/Materials	- Computer with CAD Program (i.e. Revit, Onshape, SketchUp) - Sample Designs		
Interdisciplinary Connections	SL.PE.11-12.1 Initiate and participate effectively in a range of collaborative discussions with diverse partners on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. SL.II.11-12.2 Integrate multiple sources of information presented in diverse media or formats to make informed decisions and solve problems, evaluating the credibility and accuracy of each source. SL.ES.11-12.3 Evaluate a speaker's perspective, reasoning, use of evidence, and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone.		
Life Literacies & Key Skills	9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas 9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities 9.4.12.CI.3: Investigate new challenges and opportunities for personal growth, advancement, and transition 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving		
Information and Media Literacy & Technology Literacy	9.4.12.IML.1: Compare search browsers and recognize features that allow for filtering of information. 9.4.12.IML.2: Evaluate digital sources for timeliness, accuracy, perspective, credibility of the source, and relevance of information, in media, data, or other resources 9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design 9.4.12.IML.4: Assess and critique the appropriateness and impact of existing data visualizations for an intended audience 9.4.12.IML.5: Evaluate, synthesize, and apply information on climate change from various sources appropriately		

	9.4.12.IML.6: Use various types of media to produce and store information on climate change for different purposes and audiences with sensitivity to cultural, gender, and age diversity 9.4.12.IML.7: Develop an argument to support a claim regarding a current workplace or societal/ethical issue such as climate change 9.4.12.IML.8: Evaluate media sources for point of view, bias, and motivations 9.4.12.IML.9: Analyze the decisions creators make to reveal explicit and implicit messages within information and media 9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task 9.4.12.TL.2: Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data. 9.4.12.TL.3: Analyze the effectiveness of the process and quality of collaborative environments. 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem 9.2.12.CAP.7: Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest. 9.2.12.CAP.8: Determine job entrance criteria (e.g., education credentials, math/writing/reading comprehension tests, drug tests) used by employers in various industry sectors.		
Career Readiness, Life Literacies & Key Skills Practices	Attend to financial well-being. Demonstrate creativity and innovation. Utilize critical thinking to make sense of problems and persevere in solving them. Model integrity, ethical leadership, and effective management. Use technology to enhance productivity, increase collaboration, and communicate effectively. Work productively in teams while using cultural/global competence.		
Modifications			
Multi-Lingual Learners	Special Education	At-Risk	Gifted and Talented
● Provide a variety of texts and resources on curriculum topics at a range of reading levels. ● Provide models of completed homework assignments, projects, etc. ● Assign a native language partner.	● Receive large project as smaller tasks with individual deadlines. ● Only do one room, instead of the entire floor. ● Individual or small-group instruction.	● Use scaffolding for complex tasks. ● Allow students many opportunities for practice and learning	● Offer choices, once finished with basic task, with personal interest being the key. ● Make a CAD plan of “dream home”. Defend its features in terms of flow, design type, and the other objectives of this unit. ● Include the CAD plan of another floor or level of your home

Architectural Design**Unit 6: Architectural Models****Time Allotted: Approximately 8-10 Weeks**

New Jersey Student Learning Standards (NJSLS)

8.2.12.ED.1: Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.

8.2.12.ED.2: Create scaled engineering drawings for a new product or system and make modifications to increase optimization based on feedback.

8.2.12.ED.3: Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis.

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.

Essential Questions	Student Learning Objectives	Suggested Tasks/Activities	Evidence of Learning (Assessment)
➤ Why do architects use floor plans, elevations, artistic renderings, <i>AND</i> physical 3D models to promote their designs? ➤ How does physical modelling differ from CAD modelling?	➤ Describe the features and characteristics of 3D modeling. ➤ Describe some applications of 3D architectural models. ➤ Identify some safety concerns when working on architectural models ➤ Describe tools and materials commonly used for architectural model building. ➤ Identify some famous buildings by their models. ➤ Contrast architectural modeling as a 3D visual tool to the 2D modeling described in earlier units. ➤ Create a prototype of an object ➤ Defend a proposal for a building design by presenting a variety of finished models to a panel of “investors”.	➤ Practice with tools and techniques for building the 3D model. ➤ Evaluate the pros and cons for each type of architectural drawing (floorplans, elevations, and section drawings), as well as CAD plans, and 3D modeling. ➤ Create a 3D model of a simple single-story home. ➤ Create a 3D model of a multi-story, complex home ➤ Create a persuasive presentation to a panel of “investors” trying to sell your home (aka “Shark Tank”).	➤ Assessment of modeling skills by drawing and labeling diagrams, making analogies, and/or making observational sketches. ➤ Assessment of problem solving skills when designing a 3D model of a single-story home. ➤ Assessment of providing and using feedback by completing a peer-evaluation of a 3D model. ➤ Assessment of written and verbal mastery of unit-specific vocabulary. ➤ Assessment of mastery of unit-specific tools and techniques using a practical or performance. ➤ Assess 3D model critiques for

			the identification of problems, construction of explanations, and arguments based upon evidence ➤ Assessment of presentation skills by completing the “Shark Tank” -style project, including supporting documentation.
Resources/Materials	- CAD Program, Tools, Construction Materials, Rapid Prototyping Devices, Laptop Computer with Presentation Software		
Interdisciplinary Connections	SL.PE.11-12.1 Initiate and participate effectively in a range of collaborative discussions with diverse partners on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. SL.II.11-12.2 Integrate multiple sources of information presented in diverse media or formats to make informed decisions and solve problems, evaluating the credibility and accuracy of each source. SL.ES.11-12.3 Evaluate a speaker's perspective, reasoning, use of evidence, and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone.		
Life Literacies & Key Skills	9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas 9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities 9.4.12.CI.3: Investigate new challenges and opportunities for personal growth, advancement, and transition 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving		
Information and Media Literacy & Technology Literacy	9.4.12.IML.1: Compare search browsers and recognize features that allow for filtering of information. 9.4.12.IML.2: Evaluate digital sources for timeliness, accuracy, perspective, credibility of the source, and relevance of information, in media, data, or other resources 9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design 9.4.12.IML.4: Assess and critique the appropriateness and impact of existing data visualizations for an intended audience 9.4.12.IML.5: Evaluate, synthesize, and apply information on climate change from various sources appropriately 9.4.12.IML.6: Use various types of media to produce and store information on climate change for different purposes and audiences with sensitivity to cultural, gender, and age diversity 9.4.12.IML.7: Develop an argument to support a claim regarding a current workplace or societal/ethical issue such as climate change 9.4.12.IML.8: Evaluate media sources for point of view, bias, and motivations 9.4.12.IML.9: Analyze the decisions creators make to reveal explicit and implicit messages within information and media 9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task 9.4.12.TL.2: Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data. 9.4.12.TL.3: Analyze the effectiveness of the process and quality of collaborative environments. 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem		

	9.2.12.CAP.7: Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest. 9.2.12.CAP.8: Determine job entrance criteria (e.g., education credentials, math/writing/reading comprehension tests, drug tests) used by employers in various industry sectors.		
Career Readiness, Life Literacies & Key Skills Practices	Act as a responsible and contributing community member and employee Consider the environmental, social, and economic impacts of decisions. Demonstrate creativity and innovation. Utilize critical thinking to make sense of problems and persevere in solving them. Model integrity, ethical leadership, and effective management. Use technology to enhance productivity, increase collaboration, and communicate effectively. Work productively in teams while using cultural/global competence.		
Modifications			
Multi-Lingual Learners	Special Education	At-Risk	Gifted and Talented
- When possible, modify project so ELL student has simpler questions to answer, fewer spelling words, etc. - Provide a variety of texts and resources on curriculum topics at a range of reading levels. - Provide models of completed homework assignments, projects, etc. - Assign a native language partner.	- Receive large project as smaller tasks with individual deadlines. - Work with a partner. - Only do one portion, instead of the entire model home.	- Incorporate student choice. - Provide peer mentoring. - Allow students multiple opportunities for practice and learning - Use scaffolding for complex tasks.	- Offer choices, once finished with basic task, with personal interest being the key. - Make a 3D model of “dream home”. Defend its features in terms of flow, design type, and the other objectives of this unit. - Include the 3D model of another floor or level of your home

Scope and Sequence: Architecture 2020 (NEW)

Unit Title	Unit Length	Unit Summary
(1) Introduction to Architecture & Construction Techniques	4-5 Weeks	Students will be introduced to the various forms and styles of architecture as they relate to the architectural design process. They will identify “basic requirements” and learn to predict the consequences of decisions made during the design process. Students will explore various construction techniques used in architecture, past and present. They will compare and classify designs based upon their styles and features. Activities/ Projects: - Rapid Design & Redesign Challenge: (ex. Bridge/Structure to hold up textbooks) - Create a digital presentation about one of the significant structures that have been designed and built around the world highlighting the following: <i>What problem(s) did this structure solve, what problems did it create (if any), and what did we learn about this design?</i> - Poster Design project for Famous Architects including impact on history and future architecture, well known works, style used in building, and social impacts of designs - Create a digital presentation of a particular architecture style, including typical sectional and elevation views, the history, the construction technique used, and the pros/cons of that particular style. Include a few famous examples, along with their floor plans, sectional and elevation views. - Create a presentation on Architectural Failures (i.e. Tacoma Narrows Bridge) and discuss why it was a failure, what engineers/architects learned from the failure, and its impact on history and society - Construction techniques and basic engineering project (i.e. House of Cards Design Challenge & Redesign)
(2) Safety	1-2 Weeks	Students will learn how to properly and safely use technological tools and machinery (i.e. Exacto Knife, Bandsaw, Drill Press, Belt Sander, Hot Glue Gun, etc.) as well as demonstrate an understanding of the OSHA Safety Regulations and proper clothing/personal protective equipment. Students will take a written safety test, explain verbally how to use the equipment, and will complete a hands-on assessment. Activities/Projects: - Scavenger hunt to identify tools and precautions in the classroom and shop. - Hands-on Project - Written Test on Safety

(3) Architectural Plans & Working in Scale	5-6 Weeks	Students will explore the concept of scale and utilize it in the creation of basic sketches and floor plans. Students will interpret elevation drawings to identify the purpose, key features and value of elevations. They will learn to utilize a floor plan to create an elevation of a single-story house. Activities/Projects: - Use a scale to sketch a few simple as well as more complex objects. - Practice with tools and techniques for drawing the floor plan. - Practice sketching ideas, given a variety of “problems” or “situations” - Practice drawing sectional views. - Given a scale and general layout, practice drawing a floor plan. - Create an exact scale floor plan of the classroom as well as a proposed, new version of the classroom to present in Classroom Redesign Pitch - Create a detailed, scaled floor plan of a single-story home, including a sectional view of one wall - Given a floor plan, practice drawing elevations. - Critique an elevation plan that is purposely flawed. - Create an elevation of a single-story home - Complete a peer-evaluation with prompts
(4) Residential Design & Interior Space Planning	6-7 Weeks	Students will identify the features, attributes and considerations involved in the design of a residence. They will learn about grouping, traffic flow, types and purposes of spaces, and residential styles. Activities/Projects: - Practice with measuring tools and techniques. - Given floor plans, identify styles. - Identify what a system is and the various systems in a home (foundation, framing, electrical, plumbing) - Create, with precision and accuracy, the first floor of your residence. Include all dimensions of key features (windows, doors, outlets) but not to scale. - Design a dream kitchen or room in a house based on criteria and constraints such as budget. Model the design in 3D software (i.e. CAD, Revit, Onshape, Homestyler) and also to scale with physical materials such as balsa wood, cardboard, matboard, paper, etc.
(5) Architectural CAD Techniques & Modeling	8-10 Weeks	Students will explore the value of computer-assisted design as it relates to architecture. Activities/Projects: - Create a CAD plan of a single-story home. - Create a CAD plan of a Tiny Home based on Green Architecture and Sustainable Design - Create a CAD plan of a client’s Dream Home

		- Critique a CAD plan that is purposely flawed.
(6) Architectural Models	8-10 weeks	Students will transform their designs into 3-D models. They will present their designs and models to potential investors, highlighting the key features of their homes. Activities/Projects: - Practice with tools and techniques for building the 3D model. - Evaluate the pros and cons for each type of architectural drawing (floor plans, elevations, and section drawings), as well as CAD plans, and 3D modeling. - Create a 3D model of a single-story home. - Create a persuasive presentation to a panel of “investors” trying to sell your home