Winslow Township School District
10-12 CAD I
Unit 5: Space Planning

Overview: In this unit, students will be introduced to the concept of space planning and programming.

Overview	Standards	Unit Focus	Essential Questions
Unit 5 **Space Planning**	• **8.2.12.ED.2** • **8.2.12.NT.2** • **9.3.12.AC.1** • **9.3.12.AC.3** • **9.3.12.AC-DES.2** • **9.3.12.AC-DES.4** • **9.3.12.AC-DES.5** • **9.3.12.AC-DES.6**	• Demonstrate an understanding of how to arrange spaces considering proximity and proportion • Students will explore the practice of using bubble diagrams to pre-plan their design work • Working with a "client" introduces additional parameters into the design process including budgets and ethics. • Compare and contrast the three areas of a residence: living, sleeping and service.	• Why does proximity and proportion matter when designing spaces utilizing a given square footage? • What challenges does working with a client bring? • Why use bubble diagrams, why not just jump onto the computer? • How do you create a bubble diagram? • What is the function of each of the three main areas of a home? • What is the FHA and how does it affect my designs?
Unit 4: *Enduring* *Understandings*	• When creating a layout, room location and size must work together to ensure the most efficient traffic flow and best use of square footage. • Along with building codes, architects and engineers must comply with the requests of a client. There are challenges involved when working with clients such as budgetary or time restraints. Sometimes there are requests that might not agree with codes or your personal taste. It is then your responsibility as a professional to manage these situations so that the client is satisfied. • Bubble diagrams are a way to pre-plan designs without using a computer. This way you can access the right side of your brain (which is responsible for emotions, feelings, color selection, etc.) and lean on the left side which dominates when using a computer because it focuses more on how to draw considering command selection, paper size, etc. • Bubble diagrams are small sketches that use circles to represent rooms and corridors. The use of circles and not squares also helps to activate the creative part of the brain. The size of the circles must be proportionately correct to make sense. • The living area contains the public areas, the sleeping contains the private areas and the service contains the utilitarian areas of the home. • The FHA (Federal Housing Authority) dictates minimum requirements for rooms.	

Curriculum Unit 5	Standards		Pacing	
			Days	Unit Days
Unit 5: **Space Planning**	8.2.12.ED.2	Create scaled engineering drawings for a new product or system and make modification to increase optimization based on feedback.	9	49
	8.2.12.NT.2	Redesign an existing product to improve form or function.	8	
	9.3.12.AC.1	Use vocabulary, symbols and formulas common to architecture and construction.	8	
	9.3.12.AC.3	Comply with regulations and applicable codes to establish and manage a legal and safe workplace.	5	
	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.	5	
	9.3.12.AC-DES.4	Apply building codes, laws and rules in the project design.	4	
	9.3.12.AC-DES.5	Identify the diversity of needs, values and social patterns in project design, including accessibility standards.	3	
	9.3.12.AC-DES.6	Apply the techniques and skills of modern drafting, design, engineering and construction to projects.	5	
	Assessment, Re-teach and Extension		2	

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Unit 4 Grade 10-12		
Enduring Understanding	**Indicator #**	**Performance Expectation**
Engineering design is a complex process in which creativity, content knowledge, research, and analysis are used to address local and global problems.	8.2.12.ED.2	Create scaled engineering drawings for a new product or system and make modification to increase optimization based on feedback.
Technology, product, or system redesign can be more difficult than the original design.	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.3	Comply with regulations and applicable codes to establish and manage a legal and safe workplace.
	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.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.

Unit 5 Grade 10-12
Assessment Plan

Teacher Created Formative Assessments • Terminology Quizzes. • Design Projects. • Tutorial exercises and packets • Pre-planning bubble diagrams **Teacher Created Summative Assessments** • End of Unit Exams. • Mid-term Exams. • Final Exams • Portfolio Review	Alternative Assessments: • Group Critiques of student work consisting of round robin style class discussions. • Conduct short research projects on construction documentation as well as master architects/engineers including analysis and reflection. • Observe online master videos and teacher created power points of CAD methods and techniques followed by round robin style group discussion. • Flash card "buzz" word review presented in a game show style.

Resources	Activities
Textbooks: Kicklighter & Thomas, *Architecture: Residential Drafting & Design*, Goodheart- Wilcox, 12th edition. French & Helsel, *Mechanical Drawing: Board and CAD Techniques, Student Edition,* McGraw-Hill Education, 13th edition. Brower, *Architectural Drafting Assignments Using AutoCAD,* Cengage Learning, 1st Edition. Ramsey/Sleeper, American Institute of Architects, *Architectural Graphic Standards,* Wiley; 12th student edition Finkelstein, *AutoCAD Bible,* Wiley; 2005 **Digital Imaging Software:** o AutoDesk: AutoCAD **Other Software:** • G Suite (Classroom, Slides, Docs, Sheets) • Microsoft Office (Word, Power Point) • Internet Browsers (Chrome, Safari) • PC Browsers (Finder, Explorer) • Diversity, Equity & Inclusion Educational Resources https://www.nj.gov/education/standards/dei/	• Teacher will discuss and demonstrate how to create bubble diagrams. • Students will design and create their own full set of construction documents using the proper sequence including a drawing list, keyed drawing titles and title blocks. These drawings will comprise the three areas of the home: living, sleeping and service. Students will be assigned a client. These full scope projects will begin with bubble diagrams. Students will intermittently meet with their "clients" throughout the course of the projects for their "approval". • Students will implement building codes from regulatory groups such as the FHA, ADA, BOCA, Dept. of Transportation, etc. into their assignments. • Students will create and maintain a "Command Notebook" listing new commands used in each project. It lists the command, its function and how to access it through the user interface. • Students will determine which scales to use as opposed to having the instructor dictate. • Students are to complete tutorial "packets" demonstrating advanced software tools and functions. • Students will calculate building materials needed for a storage shed. • Students will electronically design and draw a plan and elevation view of a tiki hut. • Students will draw side views of a wrench and a nameplate which forces them to fit their drawing into an established footprint as well as determine and draw radii for circles and arcs. • Students will re-engineering a cottage floor plan as well as a footing section for a residential home. These assignments force them to determine object size and create multiple blocks. • Students will re-design a parking lot of a Dr. Office following the code standards for parking spaces and ADA accessibility. • Students will create an electrical plan based on code requirements. • Students will design and draw a staircase of a home adherent to various code issues such as width, rail height, incline angle, etc. • Students will design and draw a landscape plan including code issues required for installing a fence and pool.

Instructional Best Practices and Exemplars	
1. Identifying similarities and differences	6. Cooperative learning
2. Summarizing and note taking	7. Setting objectives and providing feedback
3. Reinforcing effort and providing recognition	8. Generating and testing hypotheses
4. Homework and practice	9. Cues, questions, and advance organizers
5. Nonlinguistic representations	10. Manage response rates

9.1 Personal Financial Literacy, 9.2 Career Awareness, Exploration, Preparation and Training, 9.3 21st Century Life and Careers & 9.4 Life Literacies and Key Skills

9.2.12.CAP.3
Investigate how continuing education contributes to one's career and personal growth.
9.2.12.CAP.4
Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.
9.2.12.CAP.5
Assess and modify a personal plan to support current interests and postsecondary plans.
9.2.12.CAP.6
Identify transferable skills in career choices and design alternative career plans based on those skills
9.2.12.CAP.10
Identify strategies for reducing overall costs of postsecondary education (e.g., tuition assistance, loans, grants, scholarships, and student loans).
9.3.12.AR.6
Evaluate technological advancements and tools that are essential to occupations within the Arts, A/V Technology & Communications Career Cluster.
9.3.12.AR-VIS.1
Describe the history and evolution of the visual arts and its role in and impact on society.
9.3.12.AC.1
Use vocabulary, symbols and formulas common to architecture and construction
9.3.12.AC-DES.6
Apply the techniques and skills of modern drafting, design, engineering and construction to projects.
9.4.12.CI.1
Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
9.4.12.CT.1
Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).
9.4.12.CT.2
Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

9.4.12.DC.1
Explain the beneficial and harmful effects that intellectual property laws can have on the creation and sharing of content (e.g., 6.1.12.CivicsPR.16.a).
9.4.12.DC.4
Explain the privacy concerns related to the collection of data (e.g., cookies) and generation of data through automated processes that may not be evident to users (e.g., 8.1.12.NI.3).
9.4.12.IML.1
Compare search browsers and recognize features that allow for filtering of information.
9.4.12.TL.1
Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task (e.g., W.11-12.6.).

The implementation of the 21st Century skills and standards for students of the Winslow Township District is infused in an interdisciplinary format in a variety of curriculum areas that include, English language Arts, Mathematics, School Guidance, Social Studies, Technology, Visual and Performing Arts, Science, Physical Education and Health, and World Language.

Additional opportunities to address 9.1, 9.2 & 9.4:

Philadelphia Mint

https://www.usmint.gov/learn/kids/resources/educational-standards

Different ways to teach Financial Literacy.

https://www.makeuseof.com/tag/10-interactive-financial-websites-teach-kids-money-management-skills/

Modifications for Special Education/504
Students with special needs: The students' needs will be addressed on an individual and grade level using a variety of modalities. Accommodations will be made for those students who need extra time to complete assignment. Support staff will be available to aid students related to IEP specifications. 504 accommodations will also be attended to by all instructional leaders. Physical expectations and modifications, alternative assessments, and scaffolding strategies will be used to support this learning. The use of Universal Design for Learning (UDL) will be considered for all students as teaching strategies are considered.   - Small group instruction and demonstration   - Electronic, printed and verbal instruction   - One-on-one demonstration   - Leveled informational texts and videos via online   - Modeling and guided practice   - Read directions aloud   - Repeat, rephrase and clarify directions   - Extended time as needed   - Break down assignments into smaller units   - Provide shortened assignments   - Modify testing format   - Preferential seating   - Graphic organizers   - Study guides, study aids and re-teaching as needed

Modifications for At-Risk Students
Formative and summative data will be used to monitor student success. At first signs of failure, student work will be reviewed to determine support. This may include parent consultation, basic skills review and differentiation strategies. With considerations to UDL, time may be a factor in overcoming developmental considerations. More time will be made available with a certified instructor to aid students in reaching the standards.   - Contact parents, guidance & child study if students are in danger of failing.   - Provide an assignment sheet with step-by-step instructions as well as specifications for each project.   - Provide design templates.   - Provide study guides.   - Provide extended time for written assessments.   - Extended time as needed   - Read directions aloud   - Assist with organization   - Use of computer to create, edit and store student work.   - Emphasize/highlight key concepts   - Recognize success   - Provide timelines for work completion   - Break down multi-step tasks into smaller chunks   - Provide copy of class notes and graphic organizer

English Language Learners	Modifications for Gifted Students

All WIDA Can Do Descriptors can be found at this link: https://wida.wisc.edu/teach/can-do/descriptors
☐ Grades 9-12 WIDA Can Do Descriptors:
    ☐ Listening ☐ Speaking ☐ Reading
    ☐ Writing ☐ Oral Language
 Students will be provided with accommodations and modifications that may include:
• Relate to and identify commonalities in Architectural & Engineering studies in student's home country
• Use sentence/paragraph frames to assist with writing reports.
• Work with a partner to develop and understand written and design projects
• Provide extended time for written responses.
• Assist with organization
• Use of computer for quick translation
• Emphasize/highlight key concepts
• Teacher Modeling
• Peer Modeling
• Label Classroom Materials - Word Walls
	Students excelling in mastery of standards will be challenged with complex, high level challenges related to the topic.
	• Raise levels of intellectual demands
	• Require higher order thinking, communication, and leadership skills
	• Differentiate content, process, or product according to student's readiness, interests, and/or learning styles
	• Provide higher level texts
	• Expand use of open-ended, abstract questions
	• Critical and creative thinking activities that provide an emphasis on research and in-depth study
	• Enrichment Activities/Project-Based Learning/ Independent Study
	Additional Strategies may be located at the links:
	❖ Gifted Programming Standards
	❖ Webb's Depth of Knowledge Levels and/or Revised Bloom's Taxonomy
	❖ REVISED Bloom's Taxonomy Action Verbs

Interdisciplinary Connections
ELA **NJSLSA.SL1** Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively. **NJSLSA.SL2** Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally. **NJSLSA.R7.** Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words. **NJSLSA.R10.** Read and comprehend complex literary and informational texts independently and proficiently with scaffolding as needed. **NJSLSA.W4.** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience **RI.9-10.1** Accurately cite strong and thorough textual evidence, (e.g., via discussion, written response, etc.) and make relevant connections, to support analysis of what the text says explicitly as well as inferentially, including determining where the text leaves matters uncertain. **RI.9-10.2** Determine a central idea of a text and analyze how it is developed and refined by specific details; provide an objective summary of the text. **W.9-10.6** Use technology, including the Internet, to produce, share, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. **SL.9-10.5** Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance findings, reasoning, and evidence and to add interest. **SL.9-10.6** Adapt speech to a variety of contexts and tasks, demonstrating command of formal English. **RI.11-12.1** Accurately cite strong and thorough textual evidence, (e.g., via discussion, written response, etc.), to support analysis of what the text says explicitly as well as inferentially, including determining where the text leaves matters uncertain. **RI.11-12.2** Determine two or more central ideas of a text, and analyze their development and how they interact to provide a complex analysis; provide an objective summary of the text.