Winslow Township School District

11-12 CAD II

Unit 5: 3D

Overview: In this unit, students will revisit 3D drawings including isometric and perspective.

Overview	Standards	Unit Focus	Essential Questions
Unit 5 **3D**	• **8.1.12.CS.3** • **8.1.12.DA.2** • **8.2.12.ED.2** • **8.2.12.NT2** • **9.3.12.AC.1** • **9.3.12.AC-DES.2** • **9.3.12.AC-DES.6**	• Students will decipher and demonstrate the components of a 3D drawing. • Students will decipher and demonstrate an understanding of the modeling tool bar. • Students will explore the use of the view cube. • Compare and contrast 3D commands and object snaps with 2D commands and object snaps. • Students will experiment with the UCSICON.	• What is the difference between an isometric drawn in a 2D environment and a modeled perspective drawing in CAD? • What is the difference between using the modeling objects and extruding 2D objects? • How does CAD handle dimensions in 3D? • How can the UCSICON be used to edit a drawing in 3D? • How can I use the viewcube to adjust views quickly?
Unit 5: Enduring Understandings	• Isometric drawings are 2D drawings that give the illusion of 3D. AutoCAD's modeling objects are truly drawn in a 3D environment meaning they can be rotated and viewed from all six sides. • When creating modeled objects, the end user must enter each of the three dimensions. You can also create 2D objects in modeling mode and then extrude them (or give them their third dimension) at a later point in time. • It is very challenging to use 2D commands, such as dimensioning, in a 3D environment because you do not know where you are along the Z axis. Most 3D commands are similar in name to 2D commands they just happen to have the prefix 3D in front of their name. • The USCICON is editable in 3D. You can click and drag each axis. • The view cube is a fast way to move around in the 3D environment. Just click or drag the directional arrows or click on the view names themselves located on the cube. You can also click the home icon		

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Curriculum Unit 5	Standards		Pacing	
			Days	Unit Days
Unit 5: **3D**	**8.1.12.CS.3**	Compare the functions of application software, system software, and hardware.	1	16
	8.1.12.DA.2	Describe the trade-offs in how and where data is organized and stored.	1	
	8.2.12.ED.2	Create scaled engineering drawings for a new product or system and make modification to increase optimization based on feedback.	3	
	8.2.12.NT.2	Redesign an existing product to improve form or function.	3	
	9.3.12.AC.1	Use vocabulary, symbols and formulas common to architecture and construction.	3	
	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.	1	
	9.3.12.AC-DES.6	Apply the techniques and skills of modern drafting, design, engineering and construction to projects.	2	
	Assessment, Re-teach and Extension		2	

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Unit 5 Grade 11-12		
Enduring Understanding	**Indicator #**	**Performance Expectation**
A computing system involves interaction among the user, hardware, application software, and system software.	**8.1.12.CS.3**	Compare the functions of application software, system software, and hardware.
Choices individuals make about how and where data is organized and stored affects cost, speed, reliability, accessibility, privacy, and integrity.	**8.1.12.DA.2**	Describe the trade-offs in how and where data is organized and stored.
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-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.6	Apply the techniques and skills of modern drafting, design, engineering and construction to projects.

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Unit 5 Grade 11-12	
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.

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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.
 	
Other Resources:
• Https://sweets.construction.com/
• Various online home plan websites, magazines and books
• United States Department of Justice, Civil rights division, https://www.ada.gov/2010ADAstandards_index.htm
 	
Digital Imaging Software:
○ 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/
	• The teacher will demonstrate and discuss how to draw using the modeling tab and 3D commands.
	• Students will create, plot and upload the following 3D as assigned:
	  • 3D workstation
	  • Isometric drawings
	  • Multi-view drawings
	  • Small home
	  • Convert past 2d objects into 3D
	• Students will create and maintain a "3D 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 are to complete tutorial "packets" including online videos demonstrating basic 3D tools and functions.

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Instructional Best Practices and Exemplars	
1. Identifying similarities and differences 2. Summarizing and note taking 3. Reinforcing effort and providing recognition 4. Homework and practice 5. Nonlinguistic representations	6. Cooperative learning 7. Setting objectives and providing feedback 8. Generating and testing hypotheses 9. Cues, questions, and advance organizers 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).
9.2.12.CAP.13
Analyze how the economic, social, and political conditions of a time period can affect the labor market
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.CI.2
Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8).

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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/

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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

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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

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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

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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.