Course: *Construction, Building, Contracting* **Unit #***2: Technological Design*	**Year of Implementation:** 2023-2024
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Stage One - Desired Results

Link(s) to New Jersey Student Learning Standards for this course:
https://www.state.nj.us/education/cccs/2020/

- **Unit Standards:**
  - ***21st Century Life & Career Standards***
    - 9.3.12.AC-DES.1 Justify design solutions through the use of research documentation and analysi s 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.8 Apply standards, applications and restrictions pertaining to the selection and use of construction materials, components and assemblies in the project design.
    - 9.3.12.AC.6 Read, interpret and use technical drawings, documents and specifications to plan a project.

  - ***English Companion Standards***
    - Grade 9-10 Companion Standards:
      - RST.9-10.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.

        - RST.9-10.7. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
    - Grade 11-12 Companion Standards:
        - RST.11-12.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
        - RST.11-12.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics

- ***NJ Statutes:*** NJ State law mandates the inclusion of the following topics in lesson design and instruction as aligned to elementary and secondary curriculum.

  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.

  Holocaust Law: N.J.S.A. 18A:35-28 Every board of education shall include instruction on the Holocaust and genocides in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

  LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35 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 (N.J.S.A.18A:35-4.36) A board of education shall have policies and procedures in place pertaining to the selection of instructional materials to implement the requirements of N.J.S.A. 18A:35-4.35.

  Diversity and Inclusion (N.J.S.A. 18A:35-4.36a) A board of education 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.

Asian American and Pacific Islanders (AAPI) P.L.2021, c.410 Ensures that the contributions, history, and heritage of Asian Americans and Pacific Islanders (AAPI) are included in the New Jersey Student Learning Standards (NJSLS) for Social Studies in kindergarten through Grade 12 (P.L.2021, c.416)

For additional information, see

NJ Amistad Curriculum: ***http://www.njamistadcurriculum.net/***

Diversity and Inclusion: ***https://www.nj.gov/education/standards/dei/index.shtml***

- *(Sample Activities/ Lessons):* ***https://www.nj.gov/education/standards/dei/samples/index.shtml***

Asian American and Pacific Islanders:

- ***Asian American and Pacific Islander Heritage and History in the U.S.***
  A Teacher's Guide from EDSITEment offering a collection of lessons and resources for K-12 social studies, literature and arts classrooms that center around the experiences, achievements and perspectives of Asian Americans and Pacific Islanders across U.S. history.

Transfer Goal: Students will be able to independently read, sketch, and design technical drawings to convey information and solve building problems.

As aligned with LRHSD Long Term Learning Goal(s):

- communicate and collaborate using appropriate technical terms to describe, analyze, interpret, and judge their work and the work of others
- acquire, integrate, and apply design processes and essential technical skills to solve problems, create products, and improve the quality of life for our local and global community

Enduring Understandings Students will understand that. . . *EU 1* accurate measurement is essential to building and design. *EU 2* there are common practices used when creating blueprints and technical sketches. *EU3* designing a structure can be influenced by cost, resources, environment, aesthetics, current trends, function, and safety.	*Essential Questions* *EU 1* ● How do accuracy and precision affect the building and design process? ● Why is accurate measurement important to the design process? ● Why are there standardized measurements across all industries? ● Which measuring device is best for the job? *EU 2* ● How can the use of technology impact the process of creating technical drawings/blueprints? ● Is it important to include all items for a project on a single set of plans? ● What considerations should be made prior to beginning a building project? *EU 3* ● How can geographical location affect the design of a structure? ● Is the most expensive design always the best design? ● Is it important to consider the full life cycle of a product when creating it? ● Why are building codes important?

	● How are current building trends established?
<u>Knowledge</u> *Students will know . . .* *EU 1* ● the most effective measurement tool for each application. 9.3.12.AC-DES.6 ● how to define critical and non critical measurement. 9.3.12.AC-DES.6 ● the importance of accurate measurement. 9.3.12.AC-DES.6 *EU 2* ● the common practices used when creating a set of blueprints and technical sketches. 9.3.12.AC-DES.4 ● the importance of accurate dimensions. 9.3.12.AC-DES.4 ● how to identify the different markings on a set of plans. 9.3.12.AC.6 *EU 3* ● how to read and interpret building codes and how to perform a cost analysis. 9.3.12.AC-DES.8 ● how to balance different factors when creating a design. 9.3.12.AC-DES.8	*<u>Skills</u>* *Students will be able to. . .* *EU 1* ● identify and describe the different measurement systems used in industry 9.3.12.AC-DES.6 ● read and properly use various measurement devices 9.3.12.AC-DES.6 ● select the proper measuring device for the application 9.3.12.AC-DES.6 *EU 2* ● read a set of blueprints and technical drawings. 9.3.12.AC-DES.4 ● create a set of blueprints and technical drawings. 9.3.12.AC-DES.4 ● identify the different symbols and scales on a set of blueprints 9.3.12.AC.6 *EU 3* ● design a product based on various influential factors. 9.3.12.AC-DES.8 ● research to find resources and estimate cost. 9.3.12.AC-DES.8

Stage Two - Assessment

Stage Three - Instruction

Learning Plan: **Suggested Learning Activities to Include Differentiated Instruction and Interdisciplinary Connections: Each learning activity listed must be accompanied by a learning goal of A= Acquiring basic knowledge and skills, M= Making meaning and/or a T= Transfer.** *The following color codes are used to notate activities that correspond with interdisciplinary connections and 21st Century Life & Career Connections (which involves Technology Literacy): Red = Interdisciplinary Connection; Purple = 21st Century Life & Career Connection*

- Teacher led discussions on measuring, accuracy, and precision (A EU1,2)
- Demonstrations on measuring, technical drawing and dimensioning (A,M, EU2)
- Students will demonstrate proper dimensioning (M, T, EU 1,2)
- Demonstrate proper usage of measuring devices (M,T EU1,2)
- Student note taking on design factors (A, EU1,2)
- Practice new skill sets on computer generated technical drawings(M, EU1,2)
- Reading and evaluating blueprints(M,T,EU2)
- Create a legend with all relative blueprint symbols and codes (M,T EU2)
- Student presentations and demonstration on measuring devices and technical drawing software (M,T, EU1,2)
- Student journaling (M,T EU1,2)

- Site Surveying (M, T EU1)
- Students will create orthographic, multiview drawings (M, T, EU 1,2)
- Students will create Isometric, perspective drawings (M, T, EU 1,2)

Pacing Guide

Unit #	***Title of Unit***	***Approximate # of teaching days***
1	Safety	20
2	Reading, Sketching, and Design	30
3	Sub Contracting	50
4	Framing and Rough Carpentry	80

Instructional Materials

A fully equipped shop including but not limited to:

Hand Tools (Hammers, Pliers, Screwdrivers, Nutdrivers, Wrenches, Squares, Tin Snips, Chisels, Cross Cut Saws, Mallets, Putty Knives, Measuring Tapes, Utility Knives, Wire Strippers, Rulers, Caulk Guns, Paint Brushes, Chalk Line)

Power Tools (Cordless Drills, Impact Drivers, Cordless Circular Saws, Cordless Jig Saws, Cordless Reciprocating Saws, Cordless Routers, Cordless Framing Nailers, Cordless Finishing Nailers, Cordless Stapler)

Materials (Framing Supplies, Roofing Supplies, Mechanical Fasteners, Electrical Supplies, Plumbing Supplies, Paint, Masonry Supplies, Sealing & Insulation Materials)

Accommodations

Special Education: The curriculum will be modified as per the Individualized Education Plan (IEP). Students will be accommodated based on specific accommodations listed in the IEP.

Students with 504 Plans: Students will be accommodated based on specific accommodations listed in the 504 Plan.

English Language Learners: Students will be accommodated based on individual need and in consultation with the ELL teacher.

Students at Risk of School Failure: Students will be accommodated based on individual need and provided various structural supports through their school.

Gifted and Talented Students: Students will be challenged to enhance their knowledge and skills through acceleration and additional independent research on the subject matter.