

Course: *Capstone in Metalworking*
Unit #: *2 - Project Preparation*

Year of Implementation: 2024-2025

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Stage One - Desired Results

Link(s) to New Jersey Student Learning Standards for this course:

{provide all applicable links to standards here}

<https://www.state.nj.us/education/cccs/2020/>

- **Unit Standards:** *(keep each of the following headings in place)*

- **21st Century Life & Career Standards**

- 9.3.MN-PPD.3 Monitor, promote and maintain a safe and productive workplace using techniques and solutions that ensure safe production of products.
- 9.3.MN-QA.3 Coordinate work teams to create a product that meets quality assurance standards.
- 9.3.MN-QA.4 Employ project management processes using data and tools to deliver quality, value-added products.
- 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas
- 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

<https://www.state.nj.us/education/cccs/2020/2020%20NJSLS-CLKS.pdf>

- **English Companion Standards**

- RI.9-10.7. Analyze various perspectives as presented in different mediums (e.g., a person's life story in both print and multimedia), determining which details are emphasized in each account.
- WHST.9-10.5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
- *WHST.9-10.10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences*
- Grade 9-10 Companion Standards:

https://www.nj.gov/education/standards/ela/Docs/2016NJSLS-ELA_Companion9-10.pdf

- Grade 11-12 Companion Standards:
https://www.nj.gov/education/standards/ela/Docs/2016NJSLS-ELA_Companion11-12.pdf
- **Interdisciplinary Content Standards**
 - RI.9-10.7. Analyze various perspectives as presented in different mediums (e.g., a person's life story in both print and multimedia), determining which details are emphasized in each account.
 - NJSLSA.W2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content
- **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: <https://www.nj.gov/education/amistad/about/>

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 use their learning to carefully draft, write, edit and polish a project proposal.

As aligned with LRHSD Long Term Learning Goal(s): <https://www.lrhsd.org/Page/6163>

- communicate and collaborate using appropriate technical terms to describe, analyze, interpret, and judge their work and the work of others
- understand the impact of technology in addressing real-world problems, enhancing life, and extending human capabilities to meet the challenges of 21st century society

Enduring Understandings

Students will understand that . . .

- *Effective preparation and planning goes into a successful project. It is important to generate multiple solutions and assess (in as many terms as possible)*

Essential Questions

- *How do designers and engineers around the world generate and defend solutions to technological problems?*

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|---|--|
| <p><i>which design is the best for solving the problem given the original constraints and specifications in the design brief.</i></p> <ul style="list-style-type: none"> • <i>When developing plans for a solution, they will show how a product or system will function and interact with its intended users or environment.</i> | <ul style="list-style-type: none"> • <i>What technical details are needed to implement the project proposal to a successful completion?</i> |
| <p><u>Knowledge</u> Students will know . . .</p> <p><i>EU 1</i></p> <ul style="list-style-type: none"> • project preparation and planning are essential to delivering a quality product (WHST.9-10.5) • how to communicate necessary technical details to accomplish project deliverables in a given timeframe. (9.3.12.ED.1) | <p><u>Skills</u> Students will be able to . . .</p> <p><i>EU 1</i></p> <ul style="list-style-type: none"> • Create a gantt chart to effectively use their time (9.4.12.CI.1) • Identify career opportunities available that relate to their project proposal (9.4.12.CI.1) • Research certifications that align with their project proposal (9.3.MN-QA.4) • Create project plans and document the project deliverables (RI.9-10.7) |
| <p>Stage Two - Assessment</p> | |
| <ul style="list-style-type: none"> • | |
| <ul style="list-style-type: none"> • | |
| <p>Stage Three - Instruction</p> | |

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. All knowledge and skills must be addressed in this section with a corresponding lesson/activity which teaches each concept. 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

- Create a Gantt Chart to formulate a project timeline (A, EU1)
- Develop individualized career goals through research and develop a personal plan for achievement (T, EU1)
- Create a Bill of Materials which includes a inventory of materials and quantities (A, EU1)
- Generate a budget proposal that accurately details the estimated costs for the project (M, EU1)
- Finalize technical drawings (M, EU1)
- Create a flow production chart detailing processes, machines, jigs, fixtures and specific tooling required to manufacture designed parts (T, EU1)
- Research certifications and career alignment based on project proposal (T, EU1)
- Dimension and annotate technical drawings to present to peers for a design review. (T, EU1)

Pacing Guide

| <i>Unit #</i> | <i>Title of Unit</i> | <i>Approximate # of teaching days</i> |
|----------------------|------------------------------------|--|
| 1 | Project Management | 24 |
| 2 | Project Preparation | 30 |
| 3 | Implementation of Project Proposal | 70 |
| 4 | Reflection and Presentation | 11 |

Instructional Materials

- *Instructional materials would be dependent upon the independent projects proposed by the student(s).*
- *Assorted structural metals are needed on-hand along with metalworking equipment and supplies.*
- *Welding, processing equipment, and laptops/desktops capable of running computer-aided-manufacturing software (such as SolidWorks, OnShape, Autodesk Fusion/Inventor) is required.*
- *A subscription to machinist reading materials, such as Modern Machine Shop, magazine should be purchased and available for students to generate relevant ideas.*
- *Software and display means for student presentation.*

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.