

Course: *Advanced Construction and Carpentry*
Unit #4: Material Selection & Interactions

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-PRO.2 Manage safe and healthy production working conditions and environmental risks
 - 9.3.12.AC-DES.1 Justify design solutions through the use of research documentation and analysis of data.
 - 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.8 Apply standards, applications and restrictions pertaining to the selection and use of construction materials, components and assemblies in the project design.
 - **English Companion Standards**
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 - Grade 9-10 Companion Standards:
 - RST.9-10.5. Analyze the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
 - 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.
 - **Interdisciplinary Content Standards**

- 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
- HS-ESS2-5 Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.
- **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 select the appropriate materials based on physical properties and interactions.

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

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

Enduring Understandings {use Arial 11 font}

Students will understand that. . .

EU 1

Essential Questions {use Arial 11 font}

- What materials should be used to complete the task?

sustainable construction is dependent on proper material choices.

EU 2

materials selected must have the proper chemical makeup, strength, and durability required for the specific area and condition of use.

EU 3

materials interact with each other on both a structural and chemical level.

- Will the materials work together?

Knowledge

Students will know . . .

EU 1

- that materials interact with each (9.3.MN-PRO.2, 9.3.12.AC-DES.3)
- how the environment affects material selection (HS-ESS2-5, 9.3.12.AC-DES.1)
- how material choice impacts environmental sustainability (9.3.MN-PRO.2, HS-ESS2-5)

EU 2

- what materials to use in specific environmental situations (9.3.MN-PRO.2, 9.3.12.AC-DES.1)
- the chemical makeup of various materials (RST.11-12.3, RST.11-12.4)
- what makes a material strong and/or durable (RST.11-12.3, 9.3.12.AC-DES.4)

EU 3

- the structural forces involved in material selection (9.3.12.AC-DES.6, 9.3.12.AC-DES.3)
- which materials should be stored or used separately (9.3.12.AC-DES.4, RST.11-12.4.)

Skills

Students will be able to . . .

EU 1

- select and use the appropriate materials for the job. (9.3.12.AC-DES.8, HS-ESS2-5)
- read and interpret SDS information. (9.3.12.AC-DES.4)
- determine the environmental impact of various resources. (9.3.12.AC-DES.4, 9.3.MN-PRO.2)

EU 2

- select and use the appropriate materials bases on the environment (9.3.12.AC-DES.8, 9.3.MN-PRO.2)
- determine a materials relative strength through observation and experimentation (9.3.12.AC-DES.8)

EU 3

- map out forces (9.3.12.AC-DES.8, 9.3.12.AC-DES.3)
- safely use and store various materials (9.3.12.AC-DES.4, RST.11-12.4.)
- locate information needed to determine material usage and safety (9.3.12.AC-DES.4, RST.11-12.4.)

- why one material would be chosen over another for a seemingly similar project (9.3.12.AC-DES.4)

Stage Two - Assessment

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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. {place A, M and/or T along with the applicable EU number in parentheses after each statement} 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**

- Teacher led discussions on materials and how the environment affects their longevity (A EU1, 2, 3)
- Demonstrations with job specific tools and tasks. (A,M, EU1, 2, 3)
- Student note taking on various materials and their uses(A, EU1, 2, 3)
- Practice new skill sets in specific in material choices for indoor construction (M, EU1,2,3)
- Practice new skill sets in specific in material choices for outdoor construction (M, EU1,2,3)
- Student presentations describing material choices and how the environment affects (M,T, EU1,2,3)
- Student journaling (M,T EU1,2,3)
- Demonstrate setting up a mobile work site for framing.(M,T, EU1,2,3)
- Design and construct a flooring system with all necessary materials(M,T, EU1,2,3)
- Design and construct a wall system with all necessary materials(M,T, EU1,2,3)
- Design and construct a roofing system with all necessary materials(M,T, EU1,2,3)
- Student reflection,(improving the design, improving workflow, improving site set up, dividing tasks for workers.)(MT, EU1,2,3)
- Demonstrate knowledge of local building codes(M,T,EU1,2,3)
- Install switches, outlets, and any other electrical components. (M,T, EU1,2,3)

- Install flooring and tile, (M,T, EU1,2,3)
- Install pipes, spigots, sinks, and other plumbing components (M,T, EU1,2,3)

Pacing Guide

{This chart will be identical in all of the units for this course.}

Unit #	Title of Unit	Approximate # of teaching days
1	Jobsite Safety	20
2	Framing	55
3	Construction Specializations	45
4	Material Selection & Interactions	15

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)

PPE (Hardhats, Fall Protection, Safety Glasses, Respirators, Gloves, Knee Pads, Coveralls, Face Shields)

Equipment (Ladders, Scaffolding, Fall Arrest Points, Moving Equipment)

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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.