PATERSON PUBLIC SCHOOLS

Preparing All Children for College and Career

Department of College and Career Readiness

Language of Architecture & Construction (Construction Careers Exploration) Curriculum

10.0 Credits

Unit 6: Printing

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Language of Architecture & Construction (Construction Careers Exploration)

Course Description

Language of Architecture and Construction (Construction Careers Exploration) is a 10.0 credit seminar-style course that exposes students to many career industries and fields. The course is split into two sections, in which students are actively taking two of the eight topics/units covered during one academic year. These topics include: Graphic Design, Construction, Drafting-General, Woodworking, C-ROM, Printing, Safety, and Automotive.

Students acquire introductory-level knowledge and skills of these disciplines, and allows them to make an informed decision about their continued program of study in a given career field.

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Pacing Guide		
Unit	**Topic**	**Suggested Timing**
COHORT A – 35 weeks of instruction		
Unit 1	Introduction and Overview of Graphic Design	approx. 9 weeks
Unit 2	Introduction and Overview of Construction	approx. 9 weeks
Unit 3	Introduction and Overview of Drafting - General	approx. 9 weeks
Unit 4	Introduction and Overview of Woodworking	approx. 8 weeks
COHORT B – 35 weeks of instruction		
Unit 5	Introduction and Overview of C-ROM	approx. 9 weeks
Unit 6	Introduction and Overview of Printing	approx. 9 weeks
Unit 7	Introduction and Overview of Safety	approx. 9 weeks
Unit 8	Introduction and Overview of Automotive	approx. 8 weeks

Educational Technology Standards

8.1.12.A.1, 8.1.12.B.2, 8.1.12.C.1, 8.1.12.D.1, 8.1.12.E.1, 8.1.12.F.1

- **Technology Operations and Concepts**
  - Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.

- **Creativity and Innovation**
  - Apply previous content knowledge by creating and piloting a digital learning game or tutorial.

- **Communication and Collaboration**
  - Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.

- **Digital Citizenship**
  - Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.

- **Research and Information Literacy**
  - Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.

- **Critical Thinking, Problem Solving, Decision Making**
  - Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.

Career Ready Practices

Career Ready Practices describe the career-ready skills that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

CRP1. **Act as a responsible and contributing citizen and employee**
Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.

CRP2. Apply appropriate academic and technical skills.
Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.

CRP3. Attend to personal health and financial well-being.
Career-ready individuals understand the relationship between personal health, workplace performance and personal well-being; they act on that understanding to regularly practice healthy diet, exercise and mental health activities. Career-ready individuals also take regular action to contribute to their personal financial well-being, understanding that personal financial security provides the peace of mind required to contribute more fully to their own career success.

CRP4. Communicate clearly and effectively and with reason.
Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.

CRP5. Consider the environmental, social and economic impacts of decisions.
Career-ready individuals understand the interrelated nature of their actions and regularly make decisions that positively impact and/or mitigate negative impact on other people, organization, and the environment. They are aware of and utilize new technologies, understandings, procedures, materials, and regulations affecting the nature of their work as it relates to the impact on the social condition, the environment and the profitability of the organization.

CRP6. Demonstrate creativity and innovation.
Career-ready individuals regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.

CRP7. Employ valid and reliable research strategies.
Career-ready individuals are discerning in accepting and using new information to make decisions, change practices or inform strategies. They use reliable research process to search for new information. They evaluate the validity of sources when considering the use and adoption of external information or practices in their workplace situation.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.

CRP9. Model integrity, ethical leadership and effective management.
Career-ready individuals consistently act in ways that align personal and community-held ideals and principles while employing strategies to positively influence others in the workplace. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the directions and actions of a team or organization, and they apply insights into human behavior to change others' action, attitudes and/or beliefs. They recognize the near-term and long-term effects that management's actions and attitudes can have on productivity, morals and organizational culture.

CRP10. Plan education and career paths aligned to personal goals.
Career-ready individuals take personal ownership of their own education and career goals, and they regularly act on a plan to attain these goals. They understand their own career interests, preferences, goals, and requirements. They have perspective regarding the pathways available to them and the time, effort, experience and other requirements to pursue each, including a path of entrepreneurship. They recognize the value of each step in the education and experiential process, and they recognize that nearly all career paths require ongoing education and experience. They seek counselors, mentors, and other experts to assist in the planning and execution of career and personal goals.

CRP11. Use technology to enhance productivity.
Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.

CRP12. Work productively in teams while using cultural global competence.
Career-ready individuals positively contribute to every team, whether formal or informal. They apply an awareness of cultural difference to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.

Differentiated Instruction

Strategies to Accommodate Students Based on Individual Needs

Time/General	Processing	Comprehension	Recall
• Extra time for assigned tasks • Adjust length of assignment • Timeline with due dates for reports and projects • Communication system between home and school • Provide lecture notes/outline	• Extra Response time • Have students verbalize steps • Repeat, clarify or reword directions • Mini-breaks between tasks • Provide a warning for transitions • Reading partners	• Precise step-by-step directions • Short manageable tasks • Brief and concrete directions • Provide immediate feedback • Small group instruction • Emphasize multi-sensory learning	• Teacher-made checklist • Use visual graphic organizers • Reference resources to promote independence • Visual and verbal reminders • Graphic organizers
Assistive Technology	**Tests/Quizzes/Grading**	**Behavior/Attention**	**Organization**
• Computer/whiteboard • Tape recorder • Spell-checker • Audio-taped books	• Extended time • Study guides • Shortened tests • Read directions aloud	• Consistent daily structured routine • Simple and clear classroom rules • Frequent feedback	• Individual daily planner • Display a written agenda • Note-taking assistance • Color code materials

Enrichment

Strategies Used to Accommodate Based on Students Individual Needs:

- Adaption of Material and Requirements
- Evaluate Vocabulary
- Elevated Text Complexity
- Additional Projects
- Independent Student Options
- Projects completed individual or with Partners
- Self Selection of Research
- Tiered/Multilevel Activities
- Learning Centers
- Individual Response Board
- Independent Book Studies
- Open-ended activities
- Community/Subject expert mentorships

Assessments

Suggested Formative/Summative Classroom Assessments

- Timelines, Maps, Charts, Graphic Organizers
- Teacher-created Unit Assessments, Chapter Assessments, Quizzes
- Teacher-created DBQs, Essays, Short Answer
- Accountable Talk, Debate, Oral Report, Role Playing, Think Pair, and Share
- Projects, Portfolio, Presentations, Prezi, Gallery Walks
- Homework
- Concept Mapping
- Primary and Secondary Source analysis
- Photo, Video, Political Cartoon, Radio, Song Analysis
- Create an Original Song, Film, or Poem
- Glogster to make Electronic Posters
- Tumblr to create a Blog

Interdisciplinary Connections

English Language Arts
- Journal writing
- Close reading of industry-related content
- Create a brochure for a specific industry
- Keep a running word wall of industry vocabulary

Social Studies
- Research the history of a given industry/profession
- Research prominent historical individuals in a given industry/profession
- Use historical references to solve problems

World Language
- Translate industry-content
- Create a translated index of industry vocabulary
- Generate a translated list of words and phrases related to workplace safety

Math
- Research industry salaries for a geographic area and juxtapose against local cost of living
- Go on a geometry scavenger hunt
- Track and track various data, such as industry's impact on the GDP, career opportunities or among of individuals currently occupying careers

Fine & Performing Arts
- Create a poster recruiting young people to focus their studies on a specific career or industry
- Design a flag or logo to represent a given career field

Science
- Research the environmental impact of a given career or industry
- Research latest developments in industry technology
- Investigate applicable-careers in STEM fields

New Jersey Students Learning Standards

9.3– Career and Technical Education

Career Cluster: Science, Technology, Engineering & Mathematics (ST)

- 9.3.ST.3: Describe and follow safety, health and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.
- 9.3.ST.6: Demonstrate technical skills needed in a chosen STEM field.

Career Cluster: Engineering & Technology (ST-ET)

- 9.3.ST-ET.1: Use STEM concepts and processes to solve problems involving design and/or production.
- 9.3.ST-ET.4: Apply the elements of the design process.

Common Career Technical Core (CCTC)

Career Cluster Science, Technology, Engineering, and Mathematics (ST)

- ST.3 – Describe and follow safety, health and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.
- ST.6–Demonstrate technical skills needed in a chosen STEM field.

Career Cluster Engineering & Technology

- ST-ET.1–Use STEM concepts and processes to solve problems involving design and/or production.
- ST-ET.4 –Apply the elements of the design process.

Common Core State Standards (CCSS)

CCSS - English-Language Arts

Key Ideas and Details:

- CCSS.ELA-LITERACY.RL.11-12.1 Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.

Research to Build and Present Knowledge:

- CCSS.ELA-LITERACY.W.11-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

Range of Writing:

- CCSS.ELA-LITERACY.W.11-12.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences

Course: Language of Architecture & Construction (Construction Careers Exploration) **Unit:** 6- Printing **Grade Level:** 9-12	**Unit Overview:** Printing offers a hands-on introduction to the use of machines, materials, methods, and safety regulations for printing. Craftsmanship is learned through established industry standards including the latest materials, technology, and technological techniques. All skills and techniques acquired within the printing unit are considered by industry professionals to be the fundamental knowledge for students pursuing printing course work and careers.
New Jersey Student Learning Standards (NJSLS): 9.3.12.C.3, 9.3.12.C.5, 9.3.12.C.11, 9.4.12.B. (2). 10 , 9.4.12.B.(2).11 , 9.4.12.B.(2).17; 9.3.ST.3, 9.3.ST.6; 9.3.ST-ET.1; 9.3.ST-ET.4	
Common Career Technical Core (CCTC): ST.3; ST.6; ST-ET.1; ST-ET.4	
Common Core State Standards (CCSS): RL.11-12.1; W.11-12.10; W.11-12.7	

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
Identify and implement safety procedures, printing materials, planning components. **NJSLS:** 9.3.ST.3; 9.3.ST.6; 9.3.ST-ET.1 **CCTC:** ST.3, ST.6; ST-ET.1 **CCSS:** RL.11-12.1	What are the safety concerns to be considered when working in a lab setting in school or on the job? What protection can be used in a laboratory environment? What should be part of	• Safe use of tools, equipment, and chemicals. • Safety signage • Maximizing personal productivity • Model methods for maximizing personal productivity in a	**Safety Procedures:** As a class create a safety procedure document that establishes the protocols for the course. **Prezi:** I groups of 2-4 create a prezi outlining the safety procedures, printing materials, and planning components for	**OSHA Safety Procedures Printing Industry: https://www.osha.gov/SLTC/printing_industry/** **Standard Operating Procedures Printing Industries of America: http://www.printing.org/page/10133**

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
	an effective safety program? What characteristics are essential to a functional team? What are the benefits of working in a team environment as opposed to individually? Why is planning an important aspect to project work? How does planning influence efficiency? Why is planning vital print project? How does planning influence the design of a product? How is paper graded? What type of inks are	safe environment. • Applications of various sheet goods • Characteristics of paper and cardstock • The use of inks and solvents • Measurement of layout • Planning the steps for completion of the project.	Printing I. **Plan of Procedure:** Plan a printing project outlining the materials needed and cost of job.	

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
	there? What are the different types of additives and solvents used in printing? What is the difference between fonts?			
Identify and utilize silkscreen materials necessary to complete a project. (i.e. inks, screens, and artwork) **NJSLS:** 9.3.ST-ET.4; 9.3.ST.6 **CCTC:** ST-ET.4; ST.6 **CCSS:** W.11-12.10; W.11-12.7	How do screens get copy? What is the role of silkscreen in the printing industry? What tools are used for the screening process? What shapes and materials can be screened?	• Safe use of inks and solvents • Setup a screen to print one color and three color project • Use silk screen materials to create an original project	**Silk Screen and Photography:** students were given digital cameras and directed to take photographs that would form the basis of their screen prints. Students had the option of either setting up a still life or of taking images of interesting structures within the school building. The photo image was then manipulated in Adobe Photoshop to make a high contrast film positive. Students	**How to Silkscreen Print: http://www.printing.org/page/10133** **Instructables Silk Screen: http://www.instructables.com/id/How-to-Silk-Screen/** **Warhol.org: http://www.warhol.org/education/resourceslessons/Silkscreen-Printing--Schenley-High-School/#ixzz4RVkY0aCA**

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
			combined these photographic images with stenciled areas of color in their final prints. After experimenting with various color combinations students were ready to begin their prints. To make the silkscreen stencils students made a collage in three colors to create a visually interesting and geometrically harmonizing background below the photographic printed layer of their image. Once the collage shapes were determined, students were shown how to carefully cut stencils to mirror those shapes. These shapes formed the basis for the initial screen prints, each one being printed from lightest to darkest. Students eventually	

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
			made their prints using four screens, working from the background color, through the sequence of shapes, finally printing the photographic image. **You-In Society Project:** create a silk screen project that positively impact the community or school by using art.(Create T-Shirts to raise money for a trip or a charity)	
Explore the use of letterpress, engraving, and lithography through the use of the appropriate press, type, and materials. **NJSLS:** 9.3.ST-ET.4; 9.3.ST.6	How does the selection of a font or fonts impact the final letterpress? What is a job case? What are the advantages of letterpress printing? What are the	• Follow printing from its start to present day • Safe use of letterpress • Select appropriate type fonts for the project to be printed • Demonstrate the	**Letter Press Project Design Your Own:** Students will design their own personal project incorporating different typefaces and graphic enhancers. Possible projects include party invitations, Christmas cards, personalized note	**Khan Academy Lithography Process:** https://www.khanacademy.org/partner-content/moma/moma-printmaking/v/moma-lithography-process **Printmaking Through**

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
CCTC: ST-ET.4; ST.6 **CCSS:** W.11-12.7	disadvantages of letterpress printing? What are the safety concerns to be considered when working with an offset press? What safety equipment should be used in a print shop environment? What maintenance should be part of offset press operation? What are the benefits of working in a team environment as opposed to individually? What machines are used for Engraving? What are the highlights of engraving a project?	safe use of an offset press • Strip a plate • Set up water bath • Adjust press when necessary for higher quality work • Safe use and setup of an engraving press • Multiple engravings	cards and stationary, business cards, or other fun projects. **Engraving Project:** students will use both the laser engraver and the high school's high end 3D printer to design and construct a class project designed to sort three different sizes of ball bearings without mechanisms, or basically using gravity. In this project the students use the laser engraver to cut the 2D pieces and they use the 3D printer – which is more sophisticated but also much slower – to print the ramps which help guide the bearings. Lithography Lesson: http://study.com/academy/lesson/lithography-	**the Ages:** http://centralpt.com/upload/417/15224_printmakinglessonplans.pdf **Letterpress Commons:** https://letterpresscommons.com/section/letterpress-printing-instruction/ **Engravers Network:** http://www.engraversnetwork.com/resources/

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
	How does the engraver shape the stock?		lesson-plan.html	
Demonstrate reprographics the operation of various Reprographic machines i.e. Xerox, Minolta etc. **NJSLS:** 9.3.ST-ET.4; 9.3.ST.6 **CCTC:** ST-ET.4; ST.6 **CCSS:** W.11-12.10; W.11-12.7	What are the advantages to reprographics? What are the limitations of reprographics? How do you publish on computer and print with a reprographer?	• Safe use of a reprographer • Collating a project • Binding a booklet	**Performance Test:** Students will individuals demonstrate the ability to safety use of Xerox machines. **Quick Write:** What are the features and uses of reprographic equipment in the corporate setting?	**Structure and Deterioration of Paper-based Materials https://www.nedcc.org/curriculum/lesson.class3.resources.php**
Identify and select stock and print a project using the thermography process. **NJSLS:** 9.3.ST-ET.4; 9.3.ST.6 **CCTC:** ST-ET.4; ST.6 **CCSS:** W.11-12.10; W.11-12.7	What are the safety concerns to be considered when printing thermography? What protection can be used in a laboratory environment? Why use thermography? What are the benefits of	• Business cards • Letterhead • Invitations • Process of Thermography • Setup press	**Letterhead and Business Cards:** Create a personal Letterhead and business cards using thermography. Put a personal spin on your printing. **Invitation:** Create an invitation to an event in	**Thermography and Raised Letter Printing: http://www.easyprinting123.com/thermography_printing.htm** **Thermographic Printing: https://www.youtube.com/watch?v=NCewEUoldLU**

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
	working in a team environment as opposed to individually?		your class demonstrating use of the press and thermography materials. **Journal:** What is the career and cultural significance of printing business cards?	**Thermography as a printing process:** https://www.prepressure.com/printing/processes/thermography
Develop the skills to produce digital prints through the use of programs such as Adobe, Work Publishing and Print Shop to design, layout and print a brochure. **NJSLS:** 9.3.ST-ET.4; 9.3.ST.6; 9.3.ST-ET.1] **CCTC:** ST-ET.4; ST.6; ST-ET.1 **CCSS:** W.11-12.10; W.11-12.7	What are the methods of digital printing? What are the benefits of digital printing? What are the different types of programs used to do digital printing?	• Using programs for graphics i.e. Word, Print Shop, and PageMaker etc. • Designing a multi-page brochure. • Cropping • Sizing	**Journal:** How has printing evolved over time? **Brochure:** Create a brochure for your school using the printing techniques you have learned. **Newsletter**: In groups of 2 create a newsletter for your class to inform the school community of the projects and learning that is taking place. **Demonstration:** In	**Print Technology and Graphic Imaging:** http://www.lcti.org/prospective-student-course/print-technology-graphic-imaging/ **Glossary of Terms:** http://printindustry.com/Glossary.aspx

Student Learning Objectives (SLOs)	Essential Questions	Skills & Indicators	Sample Activities	Resources
			groups of 2 demonstrate the various digital programs to edit and publish digital printing	

Unit Vocabulary

Paper Stock Weight DPI CMYK RPI Print Types Font Bleed Overprint Monotone Duotone Paper Types Lithography Levigator Limestone Squeegee Aluminum Plate Artist's Proof Proof Registration Slip sheet Solvent	Printmaking Matrix Planographic Screenprint ReliefIntaglio Monotype Monoprint Archival Deckle Tear Bar Waterleaf Paper Watermark Sizing Impression Edition To Pull a print Offset Double print Strike B.A.T Water-based Non-Toxic

Suggested Unit Projects *Choose At Least One*	
Create on of the following comprehensive design documents (resumes, flyers, newsletters, brochures) using page layout software.	Prepare a cover letter and resume for use in seeking internship or job opportunities in the printing industries.

Suggested Structured Learning Experiences	
Virtual Field Trip to MODA: Museum of DXesign http://www.museumofdesign.org/field-trips-1/	New York Times Printing Plant College Point, Queens Contact Deirdre Deignan at (718) 281-7388 or by e-mail: deignd@nytimes.com.