Pre-Engineering/Architecture
Course Compendium

UNITS OF STUDY*

Unit 1- *Introduction to Technical Drawing*

Unit 2- *Safety in the Workplace*

Unit 3- *Career Paths and Possibilities (Engineers & Architects)*

Unit 4- *The Universal Design Process & Problem Solving*

Unit 5- *Exploring Flight*

Unit 6- *Structures and Mechanics*

Unit 7- *Introduction to CAD*

Unit 8- *Prototyping and Presentations*

INTERDISCIPLINARY CONNECTIONS

NJSLS Companion Standards Grades 6-8

NJSLSA.R7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

NJSLSA.W7. Conduct short as well as more sustained research projects, utilizing an inquiry-based research process, based on focused questions, demonstrating understanding of the subject under investigation.

RST.6-8.4. 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 6- 8 texts and topics.

RST.6-8.9. Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

Science

MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

*See individual units for Pacing Guide, NJSLS Standards, Transfer Skills, Enduring Understandings, Essential Questions, Learning Objectives, Key Vocabulary, Skills, Resources, & Assessments

21st Century Life and Careers

CRP2. Apply appropriate academic and technical skills.

CRP4. Communicate clearly and effectively and with reason.

CRP6. Demonstrate creativity and innovation.

CRP7. Employ valid and reliable research strategies.

CRP11. Use technology to enhance productivity.

9.3.ST.2 Use technology to acquire, manipulate, analyze and report data.

9.3.ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance.

9.3.ST.3 Use technology to acquire, manipulate, analyze and report data.

9.3.ST.5 Demonstrate an understanding of the breadth of career opportunities and means to those opportunities in each of the Science, Technology, Engineering & Mathematics Career Pathways.

9.3.ST‑ET.1 Use STEM concepts and processes to solve problems involving design and/or production.

9.3.ST‑ET.2 Display and communicate STEM information.

9.3.ST‑SM.2 Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.

Technology

8.1.8.D.1 Understand and model appropriate online behaviors related to cyber safety, cyber bullying, cyber security, and cyber ethics including appropriate use of social media.

8.2.8.E.1 Identify ways computers are used that have had an impact across the range of human activity and within different careers where they are used.

GENERAL CONSIDERATIONS FOR DIVERSE LEARNERS		
English Language Learners	**Students Receiving Special Education Services**	**Advanced Learners**
- Personal glossary - Text-to-speech - Extended time - Simplified / verbal instructions - Frequent breaks WIDA Can Do Descriptors for Grade 6-8 WIDA Essential Actions Handbook	- Small group/One to one - Additional time - Review of directions - Student restates information - Space for movement or breaks - Extra visual and verbal cues and prompts - Preferential seating - Follow a routine/schedule - Rest breaks	- Use of high level academic vocabulary/texts - Problem-based learning - Preassess to condense curriculum - Interest-based research - Authentic problem-solving - Homogeneous grouping opportunities

See individual units for Pacing Guide, NJSLS Standards, Transfer Skills, Enduring Understandings, Essential Questions, Learning Objectives, Key Vocabulary, Skills, Resources, & Assessments

[FABRIC Paradigm](#) [Wall Township ESL Grading Protocol](#) *Use WIDA Can Do Descriptors in coordination with Student Language Portraits (SLPs).	- Verbal and visual cues regarding directions and staying on task - Checklists - Immediate feedback Students receiving Special Education programming have specific goals and objectives, as well as accommodations and modifications outlined within their Individualized Education Plans (IEP) due to an identified disability and/or diagnosis. In addition to exposure to the general education curriculum, instruction is differentiated based upon the student's needs. The IEP acts as a supplemental curriculum guide inclusive of instructional strategies that support each learner. [National Center on Universal Design for Learning - About UDL](#) [UDL Checklist](#) [UDL Key Terms](#)	[Knowledge and Skill Standards in Gifted Education for All Teachers](#) [Pre-K-Grade 12 Gifted Programming Standards](#) [Gifted Programming Glossary of Terms](#)

Students with 504 Plan
Teachers are responsible for implementing designated services and strategies identified on a student's 504 Plan.

At Risk Learners / Differentiation Strategies

Alternative Assessments Choice Boards Games and Tournaments Group Investigations Guided Reading Learning Contracts Leveled Rubrics Literature Circles Multiple Texts Personal Agendas	Independent Research & Projects Multiple Intelligence Options Project-Based Learning Varied Supplemental Activities Varied Journal Prompts or RAFT Writing Tiered Activities/Assignments Tiered Products Graphic Organizers Choice of Books/Activities Mini-Workshops to Reteach or Extend Think-Pair-Share by readiness or interest Use of Collaboration of Various Activities	Jigsaw Think-Tac-Toe Cubing Activities Exploration by Interest Flexible Grouping Goal-Setting with Students Homework Options Open-Ended Activities Use of Reading Buddies Varied Product Choices Stations/Centers Work Alone/Together

See individual units for Pacing Guide, NJSLS Standards, Transfer Skills, Enduring Understandings, Essential Questions, Learning Objectives, Key Vocabulary, Skills, Resources, & Assessments