

	Unit 1 Overview of Civil Engineering	Unit 2 Introduction to Projects	Unit 3 Project Planning	Unit 4 Site Planning	Unit 5 Architecture	Unit 6 Structural Engineer	Unit 7 Presentations and Reviews
<b>Civil Engineering and Architecture</b>	<p>Compare and contrast civil engineering and architecture.</p> <p>Describe the various individuals and agencies and their roles during the design and development of a project.</p> <p>Describe the professional and career opportunities in the field of Civil Engineering and Architecture.</p> <p>Communicate the current common practices utilized in Civil Engineering and Architecture.</p> <p>Identify the criteria and constraints, and gather information to promote viable solutions to a project.</p> <p>Work individually and in pairs to produce a solution to a project.</p> <p>Develop an understanding of how software is used as a tool to aid in the calculation and the communication of design information.</p> <p>Communicate ideas for designing a development project using various drawing methods.</p> <p>Attend public meetings and presentations based on personal models and feedback from others.</p> <p>Describe in daily journals the advantages and disadvantages of various information gathering methods.</p> <p>Develop two- and three-dimensional sketches and graphics using manual and computer-aided design (CAD) software.</p> <p>Work effectively productively as a team.</p> <p>Communicate their ideas and information to each other.</p> <p>Determine the viability of their project ideas.</p> <p>Research zoning ordinances and regulations to determine the necessary procedures for development.</p> <p>Communicate their team's design ideas and explain why they believe it will be viable.</p> <p>Communicate an understanding of the relationships of structures and their site and their responses to the environment.</p> <p>Determine the next steps to be taken and how they will proceed in developing their project.</p> <p>Answer essential questions and conclusions provided in the related activities.</p> <p>Conduct a survey of their personal residence and write their observations about the local environment.</p> <p>Apply concepts learned to team project.</p> <p>Develop and be able to read a contour map.</p> <p>Create a bubble diagram of a specified site.</p> <p>Apply principles of zoning a contour map and creating a bubble diagram to their team project.</p> <p>Retain the pros and cons of local, state, and federal regulations on site development.</p> <p>Write about their point of view and record it in their journal.</p> <p>Apply what they have learned to their team project.</p> <p>Integrate topographical data and design criteria to create and document the vertical and horizontal alignment of a road.</p> <p>Apply appropriate codes and standards to design a suitable and assessable parking lot.</p> <p>Research answers to questions identified in the project.</p> <p>Conduct simple experiments to determine the content and characteristics of a soil sample.</p> <p>Calculate the amount of water a rainstorm will drop on a parking lot design and use that information to determine the size of a stormwater management system.</p> <p>Using a site plan with contours, locate and create a cut and fill plan for the proposed four-lane road.</p> <p>Present findings of their research on a specific utility by completing an information handout.</p> <p>Communicate information to their peers using schematic symbols.</p> <p>Mathematically compare utility needs of a project and size the utility supply lines accordingly.</p> <p>Analyze and determine the selection and placement of fittings to ensure the proper use of the system.</p> <p>Apply what they have learned to their team project and landscape the site of the related site.</p> <p>Determine the source of water for their site.</p> <p>Estimate the water pressure for their site.</p> <p>Select an appropriate method of managing wastewater for their site.</p> <p>Perform preliminary design calculations and layout of the sanitary wastewater management system.</p> <p>Apply their knowledge of architectural styles gained from Activity 11, Architectural Styles.</p> <p>Apply their knowledge of floor plans to the structure for their team's project.</p> <p>Research and design an appropriate energy system for the team's project.</p> <p>Calculate and determine the heat loss or gain of the energy systems used in their team project.</p> <p>Compare and contrast the various elevation views and communicate their understanding of the views.</p> <p>Draw the exterior and interior elevations of their team's project.</p> <p>Compare and contrast sections and details, explaining their purposes in a set of architectural drawings.</p> <p>Draw the sections and details of their team's project.</p> <p>Identify and create the necessary schedules for their team's project.</p> <p>Research and learn team members about mechanical, electrical, and protection systems.</p> <p>Determine the mechanical, electrical, and protection systems necessary for their team's project.</p> <p>Draw the diagrams for the mechanical, electrical, and protection systems for their team's project.</p> <p>Identify the work of a structural engineer.</p> <p>Determine the live and dead loads of a structure using load tables and appropriate methods.</p> <p>Identify the regions of the United States that are susceptible to seismic loads.</p> <p>Research the different types of loads acting on a structure and the live, dead, and wind loads.</p> <p>Identify roofing materials, types of roof systems, rafters, and trusses; calculate the loads.</p> <p>Determine the strength of columns and beams required for a structure.</p> <p>Show floor members according to loads and modify section details to show the sizing of floor members.</p> <p>Research the various foundation types, draw sketches of each one, and describe their use.</p> <p>Prepare a foundation detail for their team's project.</p> <p>Conduct their presentation of their project including the appropriate drawings, materials, and models.</p> <p>Conduct oral presentations regarding the design and development of a team project.</p>						
<b>Michigan Grades 9-12 Grade Math Strands/Standards Linked</b>							
MATH GRADES 9-12: <a href="http://www.michigan.gov/mde/0,1607,7-140-38924_41644_42668---00.html">http://www.michigan.gov/mde/0,1607,7-140-38924_41644_42668---00.html</a>							
<b>STRAND 1: QUANTITATIVE LITERACY AND LOGIC</b>							
<b>STANDARD 1.1: REASONING ABOUT NUMBERS, SYSTEMS, AND QUANTITATIVE SITUATIONS</b>							
QSR1.1.2 Representations and Relationships							
QSR1.1.2.1 Use mathematical symbols (e.g., interval notation, set notation, summation notation) to represent quantitative relationships and situations.							
<b>STANDARD 1.3: MEASUREMENT AND PRECISION</b>							
QMP3.2 Understanding Error							
QMP3.2.1 Determine what degree of accuracy is reasonable for measurements in a given situation; express accuracy through use of significant digits, error tolerance, or percent of error; describe how errors in measurements are magnified by computation; recognize accumulated error in applied situations.							
<b>STRAND 2: ALGEBRA AND FUNCTIONS</b>							
<b>STANDARD A1: EXPRESSIONS, EQUATIONS, AND INEQUALITIES</b>							
AEE1.1.2 Solutions of Equations and Inequalities (linear, quadratic, polynomial, rational, power, exponential, logarithmic, and trigonometric)							
AEE1.1.2.3 Solve (and justify steps in the solutions) linear and quadratic equations and inequalities, including systems of up to three linear equations with three unknowns; apply the quadratic formula appropriately.							
AEE1.1.2.9 Know common formulas (e.g., slope, distance between two points, quadratic formula, compound interest, distance = velocity · time), and apply appropriately in contextual situations.							
<b>STANDARD A2: FUNCTIONS</b>							
AF2.1 Definitions, Representations, and Attributes of Functions							
AF2.1.3 Represent functions in symbols, graphs, tables, diagrams, or words, and translate among representations.							
AF2.4 Lines and Linear Functions							
AF2.4.2 Graph lines (including those of the form $x = h$ and $y = k$ ) given appropriate information.							
<b>STRAND 3: GEOMETRY AND TRIGONOMETRY</b>							
<b>STANDARD G2: RELATIONSHIPS BETWEEN FIGURES</b>							
GTRF2.2 Relationships Between Two-dimensional and Three-dimensional Representations							
GTRF2.2.1 Identify or sketch a possible 3-dimensional figure, given 2-dimensional views (e.g., nets, multiple views); create a 2-dimensional representation of a 3-dimensional figure.							
GTRF2.2.2 Identify or sketch cross-sections of 3-dimensional figures; identify or sketch solids formed by revolving 2-dimensional figures around lines.							
<b>STRAND 4: STATISTICS AND PROBABILITY</b>							
<b>STANDARD S1: UNIVARIATE DATA - EXAMINING DISTRIBUTIONS</b>							
SPUD1.1 Producing and Interpreting Plots							
SPUD1.1.1 Construct and interpret dot plots, histograms, relative frequency histograms, bar graphs, basic control charts, and box plots with appropriate labels and scales; determine which kinds of plots are appropriate for different types of data; compare data sets and interpret differences based on graphs and summary statistics.							
<b>STANDARD S4: PROBABILITY MODELS AND PROBABILITY CALCULATION</b>							
SPMPC4.1 Probability							
SPMPC4.1.2 Define mutually exclusive events, independent events, dependent events, compound events, complementary events and conditional probabilities; and use the definitions to compute probabilities.							
SPMPC4.2 Application and Representation							
SPMPC4.2.1 Compute probabilities of events using tree diagrams, formulas for combinations and permutations, Venn diagrams, or other counting techniques.							